



FRIDAY, FEBRUARY 24.

CONTENTS.

ILLUSTRATIONS:	PAGE.	GENERAL RAILROAD NEWS: PAGE.
Pasenger and Freight Locomotive, Michigan Central Railroad	116	News of the Week..... 115
The Otto Rail-joint	117	Meetings and Announcements..... 128
Peckham's Paper Car Wheels.	118	Personal..... 129
Swing Cutting-off Saw	119	Elections and Appointments..... 130
Single Cord Locking Bolt Shifter	121	Old and New Roads..... 130
CONTRIBUTIONS.....	115	Traffic and Earnings..... 131
EDITORIALS:		Annual Reports..... 132
The Guarantee of Car Wheels.	125	MISCELLANEOUS:
Some Recent Decisions of the Inter-state Commission..... 125		Technical..... 122
Strains on Wheels and Axles.	125	The Scrap Heap..... 123
The Iowa Commissioners' Report..... 126		Railroad Law..... 123
January Accidents..... 126		Omaha Demurrage Bureau..... 125
EDITORIAL NOTES..... 124, 127		The Report of the Iowa Railroad Commissioners..... 115
NEW PUBLICATIONS..... 127		Car Wheels—New York Railroad Club..... 117

NEWS OF THE WEEK.

We give below, in a condensed form, the leading news items of the week. These items will be found in detail in their appropriate columns.

Elections.—Binghamton & Williamsport, Frank M. Ward, President.—Brunswick & Western, H. S. Haines, Vice-President and General Manager.—Cincinnati, Georgetown & Portsmouth, Ralph Peters, President.—Duluth, St. Cloud, Mankato & Southern, John Cooper, President.—East St. Louis & Carondelet, Thomas D. Messler, President.—Mobile & Hattiesburg, O. F. Cawthorn, President.—Montgomery Southern, Bradford Dunham, Vice-President.—St. Louis, Arkansas & Texas, H. G. Fleming, General Superintendent.—South Atlantic & Northwestern, Waldorf H. Phillips, President.—Valley, William Thornburgh, General Manager.—Western Pennsylvania, J. N. Du Barry, President.

New Companies Organized.—Atlantic & Mississippi is chartered in Indiana.—Corinth, Birmingham & Bolivar is incorporated in Mississippi.—Duluth, Twin Cities & Southwestern files articles of incorporation in Minnesota.—Paducah & Jackson is incorporated in Kentucky.—Pasadena & Los Angeles incorporated in California.—Pittsburgh, Kentucky & Nashville is chartered in Kentucky.—Portsmouth & Southwestern, incorporated in Virginia.—Savannah & Fort Valley is chartered in Georgia.—Yankton & Southwestern is incorporated in Nebraska.

Changes and Extensions.—Alabama: Anniston & Cincinnati completed to Duke's, East Tennessee, Virginia & Georgia will survey from Maplesville to Montgomery. Mobile & Birmingham completed. Montgomery, Hayneville & Camden completes survey between Haynesville and Camden. California: Southern Pacific completes road 70 miles south of Tracy.—Florida: Orange Belt completed to Tarpon Springs; South Florida completed to Porto Tampa.—Georgia: Athens & Jefferson completes survey.—Kentucky: Louisville Southern has 30 miles of track laid, 50 more graded and 30 more surveyed.—Nebraska: Burlington & Missouri River completed to Alliance.—Ohio: Cincinnati & Richmond is completed.—Tennessee: Powells Valley will let contract.—Texas: Denison & Sherman completes survey. Marshall, Paris & Northwestern completed 18 miles from Marshall. St. Louis, Arkansas & Texas completed to Grapevine.

Traffic.—Anthracite coal shipments for the week ending Feb. 18 show a decrease of 9.3 per cent., as compared with the same period last year; bituminous shipments show an increase of 8.4 per cent. Cotton receipts, interior markets, for the week ending Feb. 17 show a decrease of 32.5 per cent. as compared with the corresponding week last year; shipments show a decrease of 32.0 per cent.; seaport receipts show a decrease of 2.5 per cent.; exports a decrease of 35.8 per cent.; cotton in sight is greater than at the same date last year by 5.7 per cent.

Earnings.—For the month of December ten roads report gross and net earnings, seven showing an increase in gross and six an increase in net. The net increase is \$2,666,099, or 18.7 per cent. Thirty-four roads report gross and net earnings for the year ending Dec. 31, 1887, showing an increase in gross and 27 an increase in net; the net increase is \$6,844,130, or 10.1 per cent.

Miscellaneous—Apopka & Atlantic is sold.—Cincinnati, Wheeling & New York placed in hands of Receiver.—Eel River & Eureka is sold to the Southern Pacific.

Contributions.

The Demurrage Question.

TO THE EDITOR OF THE RAILROAD GAZETTE:

* * * In my former hastily written letter I was guilty of a slight inaccuracy. In writing "he is informed that the next shipment that arrives for him will be sent to a public store," I should have added "if not unloaded within 48 hours." With this emendation the words accurately represent a threat that I have actually heard made. Fortunately, it appears from the editorial article on this subject in the *Railroad Gazette*

of Feb. 17, that this method of enforcing the payment of demurrage charges is not a general practice. The interesting question then remains, What is the general practice in this regard? I think others, perhaps some railroad managers as well as myself, would be glad to be enlightened on this point.

* * * It does not appear that this question has been before the courts. A judicial ruling as to what is a proper charge for car detention would be interesting and useful.

In my previous letter I omitted to discuss one point whose consideration suggests a partial solution of the demurrage problem. It seems to be generally conceded that consignees should be allowed 48 hours for the unloading of cars, without demurrage charges. Why, then, if cars are "worth \$5 a day," should not consignees have a credit for all cars unloaded within 12 or 24 hours? A discount on freight bills of \$1 per car for all cars so unloaded would be a pleasing and powerful incentive to prompt action, besides netting \$4 to the railroad company in each case, according to this method of computation.

Two incentives to virtue—the hope of reward and the fear of punishment—have always been recognized, although one of them has hitherto been ignored in dealing with the evil of car detention. Every merchant is familiar with the legend, "3 per cent. off for prompt cash; interest at 6 per cent. after 30 days." Even the tax-gatherer, the popular type of all that is rapacious and inexorable, does not disdain to employ both means. If applied to the demurrage question, in the case of regular consignees ordinarily prompt in unloading cars the credits would counterbalance the charges, and only habitual offenders and wicked persons who use cars as storehouses—for whom the demurrage fines are ostensibly established, and with whom nobody sympathizes—would suffer. J. F. H.

Omaha Demurrage Bureau.

Mr. E. E. Hill, Commissioner of the Omaha Demurrage Bureau, has sent us the following interesting notes concerning the first four months' operations of his office. * * * The *Railroad Gazette* of Jan. 27 gives a correct copy of the demurrage agreement made by the Omaha roads, which went into effect Oct. 1 last. The railroad patrons at Omaha were probably no worse than at many other places in the matter of unloading cars. That they used the cars for storehouses and that they unloaded the cars as seemed to best suit their own convenience is a matter of fact. There were parties in Omaha who would often have from 25 to 100 cars stored on side tracks in the city, while with their facilities they could not unload more than five or ten cars per day; the consequence was the yards were continually crowded to their utmost capacity. This caused extra switching, compelled the roads to keep an extra number of switch engines to do the work and there was no road in the city that could possibly give its patrons the switching service which they were loudly calling for. The cars standing waiting their turn to be unloaded were earning nothing, and no demurrage whatever was collected. On the adoption of the demurrage rules the effect was like oil on troubled waters. There was a rapid decrease in the number of cars held on storage tracks, and the switching service from being constantly unsatisfactory became the very best. All the dealers caught up, and now they seldom fall behind; cars are set for delivery and are unloaded as they arrive. Parties who used to unload a shipment of three or four cars with one team now unload shipment of one car with three or four teams. It is a fact that a majority of the patrons are in favor of the demurrage rules, claiming that it is less expensive to pay a few dollars demurrage, and have their cars set for delivery as they arrive, than it is to lie idle for the want of some particular car, which stands at the end of a long string of cars on a storage track where it is impracticable to get at it.

"In September (the month before the demurrage regulations went into effect) there was a daily average of 2,320 loaded cars standing in Omaha, while in October there was a daily average of only 1,366 cars, and the business in October was ten per cent. greater than in September. This would make a gain of 1,192 cars for 31 days each. In November there was a gain of 1,308 cars; in December, 1,260, and in January, 1,373. For the four months there is a net gain of 5,123 cars, for one month each car, or a gain of one car for 157.763 days. Allowing 50 cents per day, which is certainly a moderate estimate of the value of a car during the past four months, this produces a total of \$78,881.50 in this one item. The yard switching has been done with five engines less, and we know that this is a saving of \$5,000 per month, or \$20,000 for the four months. These two items (not counting the net proceeds of demurrage collected), it will be seen, amount to almost \$100,000.

"The demurrage regulations, so far, have been a decided success, and they are burdensome only on parties who use cars for storehouses. There are, of course, cases where discretion must be used, as, for instance, if some firm has had shipped to it five cars per day, that being the daily capacity of their business, and by some fault of the railroad, the cars are held out for two or three days, and ten or fifteen cars arrive at one time, we could not ask for any demurrage on any of these cars until after the third day. There are many such cases coming up which can, with a little discretion, be settled satisfactorily to the roads interested and with justice to the consignees. The demurrage rates are most reasonable, 48 hours being allowed for unloading, and then \$1 per day for the first five days; \$2 per day for the second five days, and \$4 for each ensuing day. The greater the offense, the greater the penalty. * * *

"There is no question but what this demurrage rule could be put into force in every city with good effect. What it has done in Omaha it can do elsewhere."

The Report of the Iowa Railroad Commissioners.

The report of the Iowa Railroad Commissioners for the year ending June 30, 1887, is based on returns from 21,824 miles of road, a little less than last year, owing to the passage of some of the Wabash lines into other hands. The mileage in Iowa itself has increased from 7,564 to 7,997. The capital stock of the roads reporting amounts to \$422,000,000, the debt to \$531,000,000, the aggregate capital is thus \$953,000,000, or \$43,600 per mile, against \$38,900 per mile in 1886 and \$39,200 in 1884. The cost of road and equipment per mile is returned at \$36,500.

The amount of home ownership of railroads is dangerously small. Only one stockholder in 40 lives in Iowa. Only one-seventieth part of the capital is owned within the state.

The comparative results of operations for 1887 and 1886 are as follows:

	1886.	1887.
EARNINGS:		
From passengers.....	\$22,932,168	\$22,549,757
From express.....	2,319,618	1,773,151
From mails.....	2,323,752	2,243,775
From freight.....	69,862,047	71,582,133
From other sources.....	3,655,447	2,336,330
Total earnings.....	101,063,935	101,344,337
Proportion for Iowa.....	36,093,106	37,529,720
Earnings per mile of road.....	5.314	4,643
Earn. per train mile, pass. trains.....	1.07	.86
Earn. per train mile, all trains earn-ing revenue.....	1.56	1.54
Earn. above operating expenses.....	37,910,781	38,414,835
Earn. above op. exps. for Iowa.....	13,161,551	4,567,841
Total earnings from all sources.....	120,075,479	101,344,337
OPERATING EXPENSES:		
Maintainance of way and buildings.....	14,322,188	14,250,654
Motive power and cars.....	9,737,859	8,971,307
Conducting transportation.....	30,057,871	30,760,063
General expenses.....	9,065,333	8,714,158
Total operating expenses.....	63,183,153	62,677,856
Proportion for Iowa.....	22,931,555	24,152,990
Op. exps. per mile of road.....	3.321	3.587
Op. exps. per train mile.....	.90	.69
Op. exps. per cent. of earn.....	.62	.62
Interest and rental.....	28,270,777	24,763,036
Int. and rent. per mil. of road.....	1,295	1,247
Int. and rent. per cent of earn.....	.28	.24
Op. exps., interest and rental.....	101,847,846	96,963,118
Op. exps., int. and rent. per mil. of road.....	4,667	4,885
Op. exps., int. and rent. per train m.....	1.13	1.06
Op. exps., int. and rent. per cent. of earnings.....	.99	.05
TRAIN MILEAGE:		
Miles run by passenger trains.....	25,699,838	26,195,101
Miles run by freight trains.....	44,773,147	46,402,787
Miles run by trains & earn. revenue.....	70,472,985	72,397,838
Miles run by con. and other trains.....	19,353,777	4,309,455
PASSENGERS:		
Total number carried.....	26,150,306	26,796,907
Total number carried one mil. per passenger, cents.....	880,188,361	870,845,146
Average rate of fare per mile, per passenger, cents.....	2.60	2.68
Av. dis. trav. by each pass., miles.....	33.66	30.11
Freight:		
Total tons carried.....	35,802,581	39,582,161
Total tons carried one mil.	6,222,095,055	6,565,196,502
Average rate in cents.....	1.12	1.08
Avg. length of haul for each ton carried, miles.....	173.80	163.33

Making the comparison as accurately as it can be done for those parts of the line which are within the state of Iowa, we have the following results:

The gross earnings for Iowa for year ending June 30, 1886, were \$36,018,106.54
The operating expenses for Iowa for year ending June 30, 1886, were 22,931,555.10

The net earnings were \$13,086,551.44
Or \$1,730 per mile on a mileage as reported of 7,564.47

The gross earnings for Iowa for year ending June 30, 1887, were \$37,529,730.62
The operating expenses for Iowa for year ending June 30, 1887, were 24,152,990.71

The net earnings were \$13,376,738.91
Or \$1,672.73 per mile on a reported mileage of 7,997.50

Seventeen roads on their entire lines show, as applicable to dividends after paying operating expenses, interest and rental an excess of \$25,413,983.99; five roads a deficit of \$861,238.22, leaving on the entire lines of these roads an excess of \$24,522,655.77 profit on a capital of \$422,236,890.71.

Thirteen roads on their lines in Iowa show, as applicable to dividends and surplus after paying operating expenses, interest and rentals, \$4,567,841.09. Eighteen show a deficit of \$1,170,349.20, leaving on the entire lines in Iowa, \$3,397,491.89 profit on capital stock of \$147,850,517.48, or 2.22 per cent. The more important deductions from these figures are given in our editorial columns.

The Commissioners wisely refrain from trying to tabulate returns as to cost of handling freight per ton-mile, or as to proportion of local to through freight; the questions being too imperfectly answered to furnish the basis of any general conclusion.

Two-thirds of the track is laid with steel rails, a little more than two-thirds is fenced. The total number of locomotives reported is 3,194, of cars 91,097.

The total number of persons reported as regularly employed in operating the roads reporting is 84,860; of the roads in Iowa, 29,078. The amount paid for personal services on the entire lines is \$43,358,798.61; for personal services in Iowa is \$15,146,234.84, or nearly 41 per cent. of the entire earnings.

During the year 132 persons were killed on the railroads in the state. Of these 8 were passengers, 59 employees and 65 others not connected with the operation of the roads. Three were killed by derailments, 7 by collisions, 3 were caught in frogs, 9 in coupling cars, 23 fell from trains, 20 in getting on and off trains, 4 at highway crossings, 26 from miscellaneous causes, 9 while stealing rides, 3 when intoxicated, 24 trespassing on track and 2 suicides.

There were 440 persons injured during the year. Of these 28 were passengers, 354 employees, and 58 others not connected with the operation of the roads nor sustaining the re-

lations of passengers. There were injured by derailments 27, collisions 22, in coupling cars 184, falling from trains 39, getting on and off trains 47, at highway crossings 8, from miscellaneous causes 138, overhead obstructions 5, stealing rides 9, trespassing upon track 10, while intoxicated 1.

The number killed is 1 more than the previous year; the number injured is 5 less.

There were 8 killed and 27 injured by derailments, there were 7 killed and 22 injured by collisions, there were 3 killed by being caught in frogs, but none injured. The 8 killed by being caught in frogs were one on the Chicago & Northwestern, one on the Chicago, Burlington & Northern and one on the Sioux City & Pacific. The Chicago & Northwestern is using a full blocking of wood for its frogs, which is not satisfactory, and proposes to adopt the Edward foot-guard.

The list of car coupling casualties does not show much tendency to diminish. For the last six years it has been as follows:

	Killed.	Injured.
1882	16	182
1883	16	98
1884	8	109
1885	18	174
1886	10	126
1887	9	134
Total	77	823

The aggregate is 900, or an average of 150 a year.

The recommendations of the Commission on this subject are not very radical; they advise the legislature to count the cost before prescribing any action. Commissioner Coffin, in a minority report, urges the adoption of much more decisive measures. The kindred subject of car-heating, they think, can best be dealt with by Congress, on account of the amount of inter-state traffic involved. They also suggest to Congress the desirability of an amendment to the Inter-state Commerce law, looking toward uniformity of classification. They repeat, with additional emphasis, the recommendations of previous reports, that the state legislature should seek to control the practice of stock watering on the one hand, and the irresponsible duplication of railroads on the other.

Ten-wheel Express Locomotive, Michigan Central Railroad.

The accompanying engraving represents a ten-wheel engine lately built by the Schenectady Locomotive Works for the Michigan Central Railroad, and intended for working either heavy passenger or fast freight trains.

The principal features of the engine are clearly shown in the engraving, and it will be seen that the fire-box is completely above the frame. In most engines built in this way, the reverse lever is placed between the wheels and the fire-box, and the width of the latter is thus narrowed for the sole purpose of giving sufficient clearance to the reversing lever. In the engine under notice, however, the reverse lever is placed altogether clear of the wheels and the width of the fire-box is only limited by the wheels.

The leading dimensions of the engine are given below:

SPECIFICATION OF A TEN-WHEEL EXPRESS LOCOMOTIVE BY THE SCHENECTADY LOCOMOTIVE WORKS.

General Dimensions.

Fuel.	Bituminous coal
Gauge of road	4 ft. 8½ in.
Total weight of locomotive, in working order	118,000 lbs.
Total weight on drivers, in working order	94,000 lbs.
Total wheel base	22 ft. 6 in.
Driving wheel base	12 ft. 2 in.
Rigid wheel base	6 ft. 3 in.
Length of main connecting rod from centre to centre of journals	9 ft. 5 in.
Transverse distance between centres of cylinders	7 ft.

Cylinders and Valves.

Diameter of cylinder and stroke of piston	19 in. × 24 in.
Horizontal thickness of piston	5¼ in.
Kind of piston packing	Dunbar steam packing
Kind of piston rod packing	U. S. Metallic
Diameter of piston rod	3⅓ in.
Size of steam ports	18 in. × 1½ in.
Size of exhaust ports	18 in. × 3 in.
Greatest travel of slide valve	5⅓ in.
Lap of slide valve	{ outside 2¾ in. inside 1¾ in.
Lead of slide valve in full stroke	3½ in.
Kind of slide valve	Allen-Richardson patent balanced
Kind of valve stem packing	U. S. Metallic

Wheels, etc.

Diameter of driving wheels outside of tires	68 in.
Diameter and length of driving axle journal	7½ in. × 8½ in.
Diameter of truck wheels	30 in.
Diameter and length of truck axle journals	5 in. × 9 in.
Diameter and length of main crank pin journal	.5¼ in. × 5¾ in.
Diameter and length of intermediate crank pin journal	.5½ in. × 4½ in.
Diameter and length of front and back crank pin journals	.4½ in. × 3½ in.
Length of driving springs from centre of hausers	main 44 in., front 34 in.

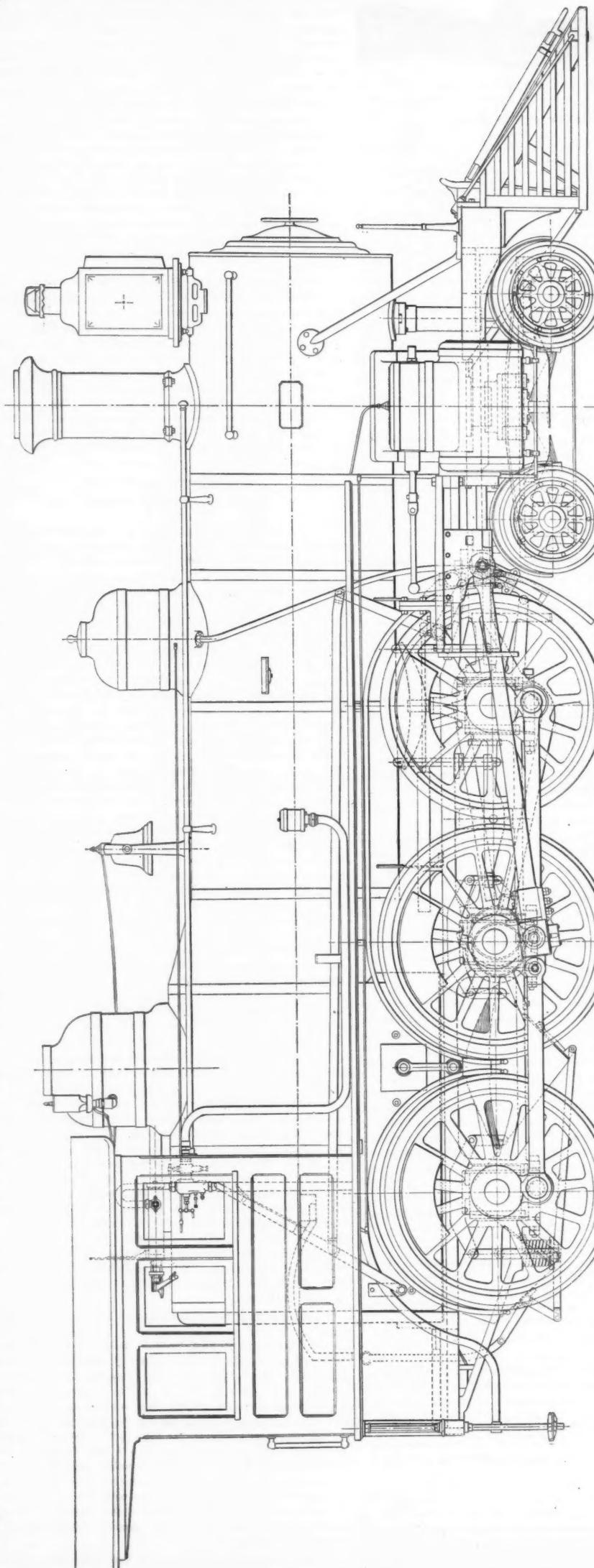
Boiler.

Working pressure	165 lbs.
Style of boiler	Wagon top
Diameter of first ring outside	58 in.
Material and thickness of plates in waist and outside side of fire-box	Steel 1½ in. thick
Horizontal seams	Quadruple riveted with welt strip inside
Circumferential seams	Double riveted
Size of fire-box inside	{ Length, 90½ in.; width, 42¾ in. Depth, front 55¾ in., back 52¾ in.
Material and thickness of plates inside of fire-box	Steel, crown, ½ in.; tube, ½ in.; sides and back, 5-16 in.
Water spaces around fire-box	Front, 4 in.; sides and back, 3 in.
Crown stayed by crown bars	
Size of crown bars	5 in. by ¾ in. welded at ends.
Material of tubes	Semi-steel
Number of tubes	247
Outside diameter of tubes	2 in.
Length of tubes over tube sheets	12 ft. 6 in.

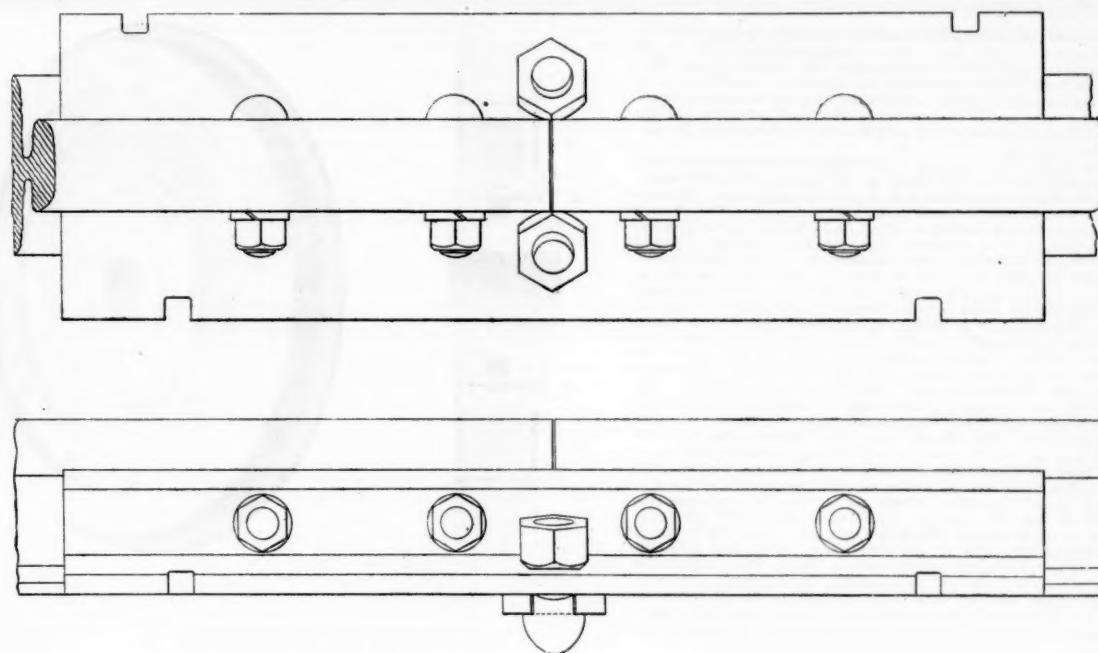
Heating surface in tubes	1,604.5 sq. ft.
Heating surface in fire-box	129.3 sq. ft.

Total heating surface	1,733.8 sq. ft.
Grate surface	28.5 sq. ft.

Style of grate	Rocking bars with drop plate
Style of ash pan	Hopper with dump plates worked from cab
Exhaust nozzle	Double
Diameter of exhaust nozzles	3½ in.
Throttle	Balanced valve in dome
Inside diameter of stack	18 in.
Smoke stack top above rail	14 ft. 9¾ in.
Boiler supplied by two injectors placed right and left	



PASSENGER AND FREIGHT LOCOMOTIVE, MICHIGAN CENTRAL RAILROAD.
Constructed by the SCHENECTADY LOCOMOTIVE WORKS, Schenectady, N. Y.



THE OTIS RAIL-JOINT.

Made by the CLARK FISHER RAIL-JOINT WORKS, Trenton, N. J.

Tender.

Weight of tender empty.....	31,000 lbs.
Number of wheels.....	8
Diameter of wheels.....	33 in.
Diameter and length of journals.....	4½ in. by 7½ in.
Total wheel base of tender.....	15 ft. 6½ in.
Distance from centre to centre of truck wheels.....	4 ft. 4 in.
Style of tender frame.....	Angle iron
Style of trucks, S. L. N. W. patent 4-wheeled channel iron bolster, centre bearing front and back with additional side bearings on back truck.	
Water capacity.....	3,800 gallons
Coal capacity.....	8 tons
Engine and Tender.	
Total wheel base, engine and tender.....	48 ft.
Total length of engine and tender over all.....	58 ft. 1¾ in.

The Otis Bolt Rail-Joint.

The rail joint illustrated in the several views herewith is really an adaptation of the "Fisher joint" principle to the ordinary angle bar, by which, instead of the rail ends being carried by only limited surfaces under the heads, additional and direct support is applied to their base.

To effect this, each bar at its centre has a hole made through its projecting part of a diameter sufficient to permit the nearly vertical legs of a 1 in. U-bolt to pass through it, as also through the corners of bases clipped out for that purpose and as close to the bar as will allow the nuts to turn. These nuts have a fair, full bearing on the upper side of the bars as shown. The horizontal part of this U-bolt is flattened to a width of 1½ in., and to give still larger bearing surface has between it and the rail bases a bearing plate 3 in. long and about as wide as the rail itself.

As this U-bolt is exactly at the meeting of the two rail ends, each has therefore an equal bearing, and when the nuts are screwed down both rail ends are maintained in the same plane. They will thus act together under a passing load, whatever may have been the previous wearing of the bars and rails. Under these conditions all cross-strains are removed from the angle bar bolts themselves, since the load being transferred to the rail base, they have now only to hold the bars laterally against the rails on either side.

It is found in actual use, as might be expected, that there is with this arrangement no longer a tendency for these bolts and nuts to loosen.

We understand it is not claimed by the manufacturers that such a joint is as efficient as the Fisher bridge joint, since one rail end must still assist in carrying the other instead of both being provided with an outer and independent support. But it is claimed that there are many thousand miles of track with worn rail ends and angle bars that can be put into comparatively good condition by the addition of this simple and inexpensive device, without abandoning either the old rails or angle bar joints. An example of this is seen on the New York elevated, which, while adopting the Fisher bridge joint for all their new rails, are putting in some of these "Otis" bolts on the Second avenue track (about two-thirds of a mile) the result of which experiment will be of interest.

The cut illustrates one of the older forms of angle bars with an excessive width of lower part, but the Otis bolt can be applied where they are much narrower—down to 1½ in. in projection, or ½ in. wider than the rail itself. It may be further observed that there is here utilized a part of the angle bar which otherwise is comparatively unoccupied so far as supporting the rail ends is concerned.

This improvement was patented a few years since by Clark Fisher, and is manufactured by the Fisher Rail Joint Works, of Trenton, N. J.

Car-Wheels—New York Railroad Club.

At the regular meeting of the New York Railroad Club, Feb. 16, the following paper was read by Mr. W. W. Snow, of the Ramapo Wheel & Foundry Co.:

GUARANTEE FOR CAR WHEELS.

This subject is one of unusual interest both to railroad companies and wheel makers, and one that has often been dis-

cussed in this room and before this club. If the discussion to-night will shed more light on this important question, it will be another point gained. There is perhaps no other subject of its class which is, and has been, treated so variably as car wheel mileage. The railroad companies on their part are anxious to obtain as much mileage as possible for the money invested. Some railroad officers think they can do this by purchasing cheap wheels, and others by demanding a very high and rigid specific guarantee. The maker is anxious to sell, and not always realizing the nature of the service or the rigid requirements, accepts whatever guarantee may be asked, and thus secures the order, often trusting to the liberality of the railroad company to save him from loss on the guarantee. This situation has prevailed to a great extent. We often hear railroad men say: "Yes, we have a guarantee of 50,000 miles, but if the wheel runs from 40,000 to 45,000 miles, we let it pass. Yet we also know, that on many roads if a wheel is guaranteed at 50,000 miles, and fails at 49,000 miles, the maker is obliged to furnish a new wheel without receiving any credit for the mileage of the old. Shall we not try to correct some of these abuses? What right has any railroad officer to give the wheel maker 10,000 miles of service, when it justly belongs to the railroad company he represents? Again what right has any railroad company to exact a new wheel on the failure of only 1,000 miles, and give no credit for the mileage the wheel has performed. Is there equity in such dealings? In this connection we will state that there are some railroads and companies which have a fair, liberal way of treating this subject, and either give credit for mileage, or charge the manufacturer only with the short service given.

What now appears to be desirable is to furnish a basis for a guarantee that will be alike advantageous to the railroad company and just to the wheel maker, an arrangement by which the railroad company will feel assured that it is getting a strong wheel—not only a safe one but one that will make a long mileage, or at least give a full equivalent for the money invested. How this is to be attained is the question for us this evening.

The safety of the wheel in service should be the first thing considered. This may be determined by a mechanical or physical test which may be obtained in a simple and satisfactory manner.

This having been accomplished, we wish to know what is the service value of a car wheel under different class and kind of equipment. To obtain this information there are only two important things for consideration: First, the average mileage or time service; second, the cost of the wheel. This cost, divided by the average service in miles or months, will give the service value of the wheel. The cost of a wheel is the difference between the price paid for the new wheel and the value of the old wheel. In regard to the value of the old wheel we will state, as a fact covering the experience of 35 years, that the price of an old wheel, of the same weight of the new, has been about 45 per cent. of the cost of the new. This has been the cost when new wheels were worth \$30 each, as well as at the present low price of \$10. From 43 to 47 per cent. has been the comparative value of the old wheel to the price of the new. We must next find the average mileage, or time in service, of the wheel. We know of no better way to determine this than to take the different experience of all the railroad companies using wheels, which may be done in some degree, by issuing a circular to the officers of the different roads. The writer understands that such an arrangement is contemplated by the joint committees of Master Mechanics and Master Car-Builders, who were appointed by the conventions in June last to confer with a committee of wheel-makers, that from the data thus received an approximate mileage and time service may be obtained.

To illustrate a proper mode of determining the service value of a car wheel we will consider 50,000 miles under a passenger car to be that service. We will take two prices paid for these wheels to illustrate a settlement which might properly be considered. First, we have a wheel the original cost of which was \$7.50; 45 per cent. of this, the value of the old wheel, would equal \$3.375, which deducted from the cost of wheel leaves \$4.125. This amount divided by 50,000 miles equals 8.25 cents for 1,000 miles of service. We will suppose a wheel fails to make more than 25,000 miles of service, the maker should pay for the shortage \$2.06. On the other hand, should the original cost of the wheel be \$11, and 45 per cent. of this be deducted, we find the service value to be \$6.05, which divided by 50 gives 12.1 cents for each 1,000 miles of service. With the same mileage as the above, the maker must pay for shortage \$3.025. Here we have two prices for settlement, both equitable, between manufacturer and consumer. The party getting the higher price for his wheel has the larger amount to pay on his shortage account, and so it ought to be for he gets more for the new wheel, the party making the cheaper wheel has no reason to complain for he has less to pay on his shortage account. This at first may not appear just to parties mak-

ing a higher priced wheel, yet on a careful consideration they may look for their reward not "in the stars," but as something they may hope to receive in the dim hereafter. The above illustration is made to cover wheels sold on a mileage basis, consequently the manufacturer who is so fortunate as to have his wheels make a long mileage, would receive a credit for service above 50,000 miles.

As there have been certain objections among some railroad officers to keep a long continued account against each individual wheel, may we not suggest a limit of say, \$0,000 miles or less, after which the account ceases. There are so few wheels making such long mileage that this ought not to be an objection. We might suggest also the same consideration as to freight service. Should it seem best to accept six years as a general average service under local freight cars, eight years might be considered the limit for any credits to be given. And what shall we say as to a guarantee for refrigerator and line car service, which are often making 60,000 miles in twelve months? If we should constitute two years for their general average service might it not be proper to limit the credit for wheel service under that equipment to four years?

Wheels on a mileage basis will insure at all times the best quality of wheel which the manufacturer can make, knowing full well that he gets a premium on all wheels making a very long mileage on passenger cars, or long time service on freight cars. This form of settlement does not in any way control the price to be paid for the wheel or any given sum for settlement, except that the value of the wheel for service may be 35 per cent. of its original cost.

The following paper was then read by Mr. Peckham, of Syracuse, N. Y.:

SAFETY OF CAST-IRON CAR WHEELS.

The prevention of accidents caused by breakages of wheels and axles can only be secured by providing against all known imperfections in manufacture, and adopting only such materials and appliances as have been found by years of practice, both in this country and Europe, to be the most reliable, with such improvements as will increase strength and safety in accordance with the well-known mechanical laws.

The safety of cast-iron wheels depends mainly upon the quality of the pig-iron used in their manufacture, although it is important that great care should be used in the manufacture and inspection of wheels before leaving the works. The dangers to which cast-iron wheels are liable are: breakages caused by the use of inferior pig-iron; contraction during the process of cooling and crystallization. By careful inspection and testing before leaving the works it is calculated that all flaws caused by unequal contraction in cooling can be detected. Providing this is done, it still leaves the wheel liable to break from an excess of phosphorus in the pig-iron (which makes it cold short), want of sufficient toughness, due to a lack of care in its manufacture and crystallization. It is possible to overcome these imperfections and render the wheels safe except as regards crystallization, if wheel manufacturers will demand the same care in the manufacture of the pig-iron as was demanded 30 years ago. Thirty years ago, cast-iron car wheels might well have been considered practically safe, as they were manufactured strictly from only the best of specular ores (*i. e.*, those containing the smallest percentage of phosphorus), with charcoal as fuel, and with a strictly cold blast; the greatest care being used to break up the ore and calcine it thoroughly before its introduction into the blast furnace, which was constructed of small capacity, requiring only a mild blast. The product of the furnace being small, allowed the ore sufficient time in the upper zone of the furnace to become thoroughly disintegrated and de-oxidized before its introduction into the zone of fusion, the result being an iron as chemically pure and tough as the average steel of to-day.

Since that time the increased demand for wheels and the pressure for lower prices, together with the introduction of hot blast and larger sized furnaces, have all combined to lower the quality of car-wheel irons, until probably not a single blast furnace in this country is using the same degree of care in the selection and preliminary preparation of its ore and the same mild cold blast that was used by car-wheel iron manufacturers 30 years ago. They cannot afford to do so at the prices at which they are compelled to sell their iron, and they can readily find a market for an inferior make. Not only have they already, by demanding lower prices, lowered the quality and safety of car wheels, but they have also increased the load of cars 100 per cent., putting that much additional pressure upon the wheels. In cheapening the cost of car-wheel iron, owing to the scarcity and cost of charcoal, some manufacturers have substituted coke in its place, and hot for the cold blast, and use a portion at least of cheaper ores. The result is an iron not only inferior in toughness, but containing a largely increased percentage of phosphorus and other impurities.

It may well be asked who is responsible for this deterioration in the quality of car-wheel irons, the car-wheel manu-

facturer, the purchasing agent or the master mechanic? Inasmuch as some of the older manufacturers of car-wheels, whose reputation was established by the careful use of first-class irons, rather than lower the quality of their wheels by using an inferior grade, and being unable to obtain prices that would justify them in using the best, went out of the business, it can hardly be said that the fault lies with the car-wheel makers.

At the present average cost of suitable ores and charcoal, and with the same care used in its manufacture, car-wheel irons of the same quality as those manufactured 30 years ago cannot be produced within \$10 a ton of the present market price of car-wheel iron; and considering that wood is becoming more and more scarce in this country, and that the use of charcoal in the manufacture of iron must necessarily decrease, and that no other fuel will take its place in the manufacture of first-class car-wheel iron, is it reasonable to expect any great improvement in its quality? Cast-iron car wheels, made from the best available car-wheel irons of to-day are honestly worth three cents a pound, and therefore the quality of wheels selling for only 1½ cents per lb. may be easily estimated. The safety of a cast-iron wheel depends also upon proper inspection before leaving the works, and during its daily use, to detect any flaws that may have developed from imperfections in casting and other causes; but with all this care, the danger still exists of breakages from too much phosphorus and crystallization.

With all these imperfections to be guarded against, the question may well be asked, can this or any other kindred association of practical mechanics say that in its opinion it is safe to use the cast-iron wheel of to-day under passenger coaches. A Master Mechanic may be compelled to use a material sent him by his purchasing agent, and feel that he is not personally responsible for any accidents that may happen, but I cannot understand how a body of practical mechanics, who are expected to protect the public as well as their employés, can consistently indorse the use under passenger coaches of cast-iron wheels as at present manufactured.

TIRE FASTENINGS.

When steel tires were first adopted it was customary to secure them to wheel centres by shrinkage alone, or in connection with tap bolts, and to only wear them down to a certain thickness, leaving sufficient metal to provide against breakages of the tire. As this method, besides being an unsafe one, necessarily prevented obtaining as much mileage from the tire as might be obtained, provided it was so secured to the centre that in case of breakage it would not become detached, tire fastenings of various kinds were introduced, and so important has their use become that in Germany, where steel-tired wheels only are used, the government ordered a careful record to be kept of the different styles of tire fastenings, with a view to determining which were the safest. From the report of the Society of State Railroad Officers of the German Railroads for the year 1886 (published by the *Railroad Gazette*, July 15, 1887), it will be seen that there were in use at that time 1,368,465 steel-tired wheels, of which number 666,635 were secured to their centres by the old method of shrinkage and tap bolts, and 701,830 by more modern fastenings. The total number of broken tires during the year 1886 was 4,530, of which number 3,771 were secured by shrinkage and tap bolts, a percentage of broken tires of 0.57, or 1 in every 180. The remaining 759 broken tires, provided with the more modern fastenings, gave a percentage of broken tires of only 0.09, or 1 in every 937—a difference in favor of the more modern tire locks of .48. Of the 3,771 broken tires on the (666,635) wheels secured by shrinkage and tap bolts 184 left the centres, or 1 in every 3,626: while of the (701,830) tires secured by shrinkage and the more modern fastenings only 25 left the centres, or 1 in every 28,000. The record shows that the older the tire the greater the liability to break, and that most of the breakages were upon tires over two years old. This largely increased percentage of breakages in old tires was no doubt due to their crystallization.

Of the more modern methods of securing tires to centres there are mainly two in general use, i.e.: the method generally used by American steel-tired plate and paper wheel manufacturers of bolting the centre to a central rib or internal flange of the tire, and the method adopted by the German railroads of shrinking tires to centres and securing them against breakages by what are known as the "Bute" and "Bork" fastenings and Mansell retaining rings.

The record of broken tires by these two methods is as follows:

	Percentage of broken tires
American method of bolting to a central rib of the tire.....	1.89 or 1 in 53
American method of bolting to an internal flange of the tire.....	.40 or 1 in 205
German method of shrinking tires to centres and securing by the Bute tire fastenings.....	.10 or 1 in 1,000
German method of shrinking tires to centres and securing by Mansell retaining rings.....	.10 or 1 in 1,000
German method of shrinking tires to centres and securing by the Bork fastenings.....	.04 or 1 in 2,500

Of the 350,000 tires shrunk to centres and secured by the Bute and Bork fastenings and Mansell retaining rings, 324,000 were secured by the Bute and Bork fastenings. Of this number only 10 broken tires left the centres, or one in every 32,400. No lives were lost by these breakages.

The Pennsylvania record of broken cast-iron wheels is stated to be .04, or one in every 2,500. Considering that they are very particular in purchasing their wheels and apply a severe drop test to all new wheels, this record is, without doubt, much better than the average cast-iron wheel will make.

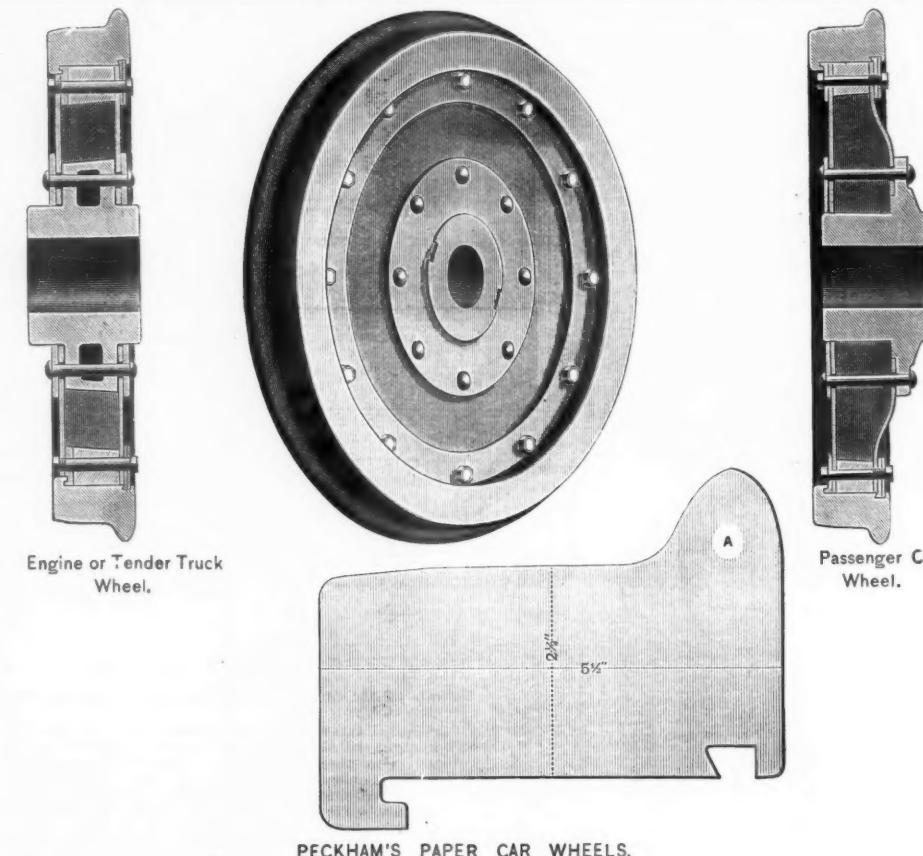
As long as a broken steel tire remains upon the centre no danger exists, and even after it leaves the centre, the centre itself, if properly constructed, is a perfect wheel (excepting the flange), while the cast-iron wheel when it breaks usually goes to pieces, leaving no support for the axle.

On an average a steel tire will outwear 10 cast-iron wheels, and taking into consideration the difference in mileage, cost of renewing the 10 cast-iron wheels, and loss of the use of the car during the operation, it will be found that a steel-tired wheel (properly constructed) is 50 per cent. cheaper per mile than a cast-iron wheel.

Mr. J. T. CHAMBERLAIN (Boston & Albany) read a paper giving the mileage of steel-tired wheels on that road. He stated that there is not a single cast-iron wheel under the Boston & Albany passenger equipment, and he gave in some detail the method employed on that road for keeping the wheel mileage. The intention of his paper was to prove that steel-tired wheels are safer and cheaper than chilled wheels. The following table gives the average mileage of 720 33-in. steel-tired wheels removed in six years to Dec. 31, 1887:

Before 1st turning.	Bet. 1st & 2d turning.	Bet. 2d & 3d turning.	Bet. 3d & 4th turning.	Total
Average miles... 111,804	82,408	57,858	43,958	
No. of wheels... 720	701	679	569	
<hr/>				
Bet. 4 h & 5th turning.	Bet. 5th & 6th turning.	After 6th turning.	miles run.	
Average miles... 41,287	39,620	30,030	26,578	
No. of wheels... 338	161	27	720	

Many of these wheels have since made further mileage in freight service.



PECKHAM'S PAPER CAR WHEELS.

The average mileage of worn out cast-iron wheels removed from passenger service during 1887 was 29,074 miles per wheel. A careful record made on the Boston & Albany in 1875 shows that 2,204 wheels representing nine different makers made an average mileage of 33,815 miles per wheel.*

The greatest mileage made by any wheel was 97,324 miles.

In contrast with the above figures, 147 defective 33-in. steel wheels were removed in 1887 after an average mileage of 289,585 miles. About half this number were removed for thin tires and were put under freight equipment, and will make further mileage.

The total cost with interest and cost of changing and turning, less value of scrap, based on results obtained with 33-in. wheels, compares as follows:

	Chilled.	Steel-tired.
Cost per wheel per 1,000 miles, cents.....	38.6	30.1

The strength of a steel tire is not reduced by vibration or crystallization, for a tire $\frac{3}{4}$ in. thick, which had made 300,000 miles, gave a tensile strength of 90,000 lbs. per sq. in. when tested at Watertown.

Mr. BROWN (Fowler Steel Wheel Co.) then read a paper describing that wheel and the method of its manufacture. A cast steel wheel blank, after being properly heated, is inserted in the rolling machine and rolled in radial lines upon its periphery until it is round, smooth on the tread and flange and of the exact size required. The process of rolling reduces the diameter of the blank and develops the tread and flange to the proportions of the M. C. B. standard. Compressing the metal in the flange and tread gives it its greatest density on the wearing surfaces. It is claimed that perfect shape, smoothness of finish and homogeneity are secured by this method.

Circulars asking questions as to the use of wheels in passenger service were issued before the meeting. Eighteen replies were received, showing that on a rough average, over 50 per cent. of the passenger equipment is furnished with steel-tired wheels, and that on many roads chilled wheels are being replaced with steel-tired wheels as fast as the cars come in for repairs. The weight most generally approved for chilled wheels in passenger service was 600 lbs. Messrs. Lobdell, Baker, Corney, Chamberlain, Snow and Peckham took part in the discussion.

The subjects for the next meeting are "Automatic Draw-bars for Freight Cars," and "Automatic Couplers for Continuous Steam Heating."

The Peckham Paper Car Wheel.

The accompanying illustrations represent a form of paper car wheel recently introduced by Mr. Peckham, of Syracuse, N. Y.

The paper centres for passenger cars differ from that for engine and tender trucks. In the former the centre has a wider bearing on the hub. In other respects the two styles of centres are very similar and will fit the same tire, the mode of tire fastening used being exactly similar.

The paper centres are provided with outer steel rims to support the tire, and consequently the paper does not bear directly on the tire. The tires are secured to these rims by shrinkage and by means of safety rings or tire locks which are slipped into the tire and bolted to the rim. The safety ring on the outside of the tire is continuous, while those on the inner side are sectional. It will be observed that the two inner rings are arranged on the principle of a lewis, the outer ring, which is plain, holding the inner beveled ring in the undercut groove in the tire. This is also effected by the Carlton & Stroudley fastening which is largely used in England and elsewhere on both passenger and freight equipment, but in that fastening the inner ring is continuous and not sectional, and has a rectangular instead of a bevel lip. The

* See report by Mr. W. E. Chamberlain, page 140 of Annual Report of Master Car-Builders' Association.

strain when the tire breaks has consequently no tendency to force the fastening outward. Both the Mansell and Carlton & Stroudley safety rings are generally made of channel section, the lip gripping the tire and rim, while the bolts serve merely to keep the rings in place. In the wheel illustrated the bolts do not so much serve to hold the rings together as to prevent the tire leaving the rim when broken.

The safety rings serve to stiffen the side plates as well as to retain the tire on the wheel.

The centres for passenger cars are bulged upon their inner sides, to increase the strength of the wheels and provide a larger bearing for the paper cores, which extend beyond the side plates and rest upon the hub and sustain the entire weight of the load. The paper cores are pressed by hydraulic pressure into the outer steel rim and on the hub, and are secured in place by steel side plates riveted firmly to the outer steel rim and between the steel hub flanges.

In order to prevent metallic contact and provide a perfect cushion for the tire and axle, the central eyes of the side plates are made slightly larger than the hub, and vulcabeston packing is inserted between the side plates and hub flanges.

To give additional strength to the connection between centre and hub, the adjustable hub flange is provided with lugs that lock into notches in the end of the hub, and the rigid hub flange with clutches that lock into jaws in the base of the inner side-plate.

In order to distribute all side strains equally upon the paper cores, the inner periphery of the steel rim is beveled to correspond with the outer periphery of the paper core, and in the engine and tender truck wheel the eye of the paper core is also beveled to correspond with the bevel of the hub projection. The side plates of the truck wheel centres extend beyond the paper cores, and are secured between wrought-steel flanges pressed upon the hub; but like the side plates of the passenger car wheel, do not come in contact with the hub flanges.

The inventor claims that these wheels embody the following improvements not contained in any other paper wheels:

1. The independent paper-cushioned centres.
2. The safety tire-locks and retaining rings.
3. The bulged paper cores of the passenger car wheels giving increased bearing of paper on the hub.
4. The beveled peripheries of the paper cores, and the corresponding bevels of the outer steel rims and hub projections.
5. The safety connections between centres and hub flanges.
6. Vulcabeston packing between side plates and hub flanges.

The inventor further claims that the features above enumerated confer the following advantages over other paper wheels:

1. Greater strength and safety.
2. Stronger and safer tire connection.
3. Increased durability of tire and centre.
4. Fifty per cent. increased mileage of tire.
5. A saving of 75 per cent. in cost of tire renewals.
6. The ability to renew tires at any railroad shop.
7. Uniformity of tires for coach and truck centres.
8. Absolute prevention of crystallization of both wheels and axles.
9. Positive prevention of noise.
10. An easier riding car.
11. Increased durability and safety of axles.

Swing Cutting-Off Saw.

The accompanying illustration represents an improved swing cutting-off saw made by the Egan Co., of Cincinnati, O. It is fitted with an improved self-adjusting balance weight which helps the operator both ways, thus facilitating rapid work. When the cut is finished, the counter-balance swing of the saw back clear of the lumber without any effort on the part of the operator.

The frame is made of large wrought-iron pipes with cast-iron braces. The frame swings on the outside of turned,



Swing Cutting-off Saw.

Made by THE EGAN CO., Cincinnati, Ohio.

sleeve boxes, and the counter-shaft runs inside these boxes. It is claimed that this method renders it impossible to get out of line, as the frame does not hang or swing on the counter-shaft, but on the boxes of the hangers. The mandrel is of steel, and has an extra large pulley, and self-oiling boxes lined with Babbitt metal. The saw is covered with a shield in order to prevent any possible accident to the operator.

It is claimed that this machine is suitable for quick and accurate work and is especially strong and likely to be durable, and that the frame is light, yet thoroughly braced, and is, therefore, not likely to get out of line with any ordinary usage.

Any further particulars can be obtained from the makers, the Egan Co., Cincinnati, Ohio.

Train Accidents in January.COLLISIONS.REAR.

1st, on Pittsburgh, Ft. Wayne & Chicago, near Wanatah, Ind., a freight train became detached in three places, and the middle and rear sections collided, damaging several cars. A man in charge of machinery was killed.

1st, on Pennsylvania, near Bennington Station, Pa., a passenger train ran into the rear of a freight train, wrecking 2 engines, a caboose and several freight cars; 2 trainmen and 1 passenger injured.

2d, on Buffalo, Rochester & Pittsburgh, at Garbutt, N. Y., a freight train broke in two and rear section ran into forward one, derailing and damaging 2 cars.

3d, on Chicago & Northwestern, near Beloit, Wis., a freight train ran into a preceding freight, demolishing engine, caboose and 3 cars.

7th, night, on West Shore, near Frankfort, N. Y., an east-bound freight train broke into three parts and the middle section ran into forward one, throwing several cars over so as to foul the opposite track. The engineman kept the end portions of the train at a safe distance, but was not aware the train had separated at two different places.

7th, on Philadelphia & Reading, at Shamokin, Pa., a mixed train ran into the rear of a passenger train, doing slight damage.

8th, on Chicago, St. Paul, Minneapolis & Omaha, at Hawthrone, Wis., a passenger train behind time, which had stopped at an unusual place for water, was run into by a closely following empty engine, doing some damage; sleeping car porter scalded to death. The report states that the runner of the empty engine was unacquainted with this division of the road, and that frost on the windows prevented his seeing the train ahead.

9th, on Union Pacific, near Edson, Wyo., a freight train ran into the rear of a passenger train, and the engine and 2 emigrant sleeping cars were badly wrecked; 2 passengers and 9 passengers and 1 trainman injured. The wrecked cars caught fire from the locomotive and burned up. The report states that, owing to something having gone

wrong with the engine, the passenger train had stopped nearly an hour, and had just begun to move when struck by the freight train.

9th, on Pennsylvania, at Hamilton Mills, N. J., a freight ran into a preceding freight, damaging an engine and several cars; conductor fatally injured.

9th, on Central Vermont, near Proctorsville, Vt., an extra freight train ran into the rear of a preceding freight, derailing and damaging several cars, injuring 1 trainman.

11th, on Louisville & Nashville, near Prospect, Tenn., a freight ran into the rear of a freight standing on a siding, damaging the engine, caboose and 3 cars.

11th, on Oregon Railway & Navigation Co.'s road, near Higard, Or., passenger train into the rear of a freight, damaging the engine and 5 cars.

11th, on Pittsburgh, Cincinnati & St. Louis, at Camp Hill, O., a coal train, a part of which had been derailed on a side track, was occupying the main track in attempting to clear up the wreck, when it was run into by a wrecking train sent to its assistance. Engineer and fireman injured. A flagman was sent out, but, it is said, failed to do his duty.

12th, on Delaware, Lackawanna & Western, near Scranton, Pa., freight train broke in two and rear section ran into forward one, damaging several cars.

12th, on New York, Lake Erie & Western, near Blaisdell, N. Y., freight train broke in two and rear section ran into forward one, wrecking several cars.

12th, on New York Central & Hudson River, near Albion, N. Y., a freight ran into a preceding freight, wrecking engine, caboose and several cars. The wreck was partially consumed by fire. A heavy snow-storm prevailed at the time.

13th, on Delaware, Lackawanna & Western, at Gravel Place, Pa., a freight ran into a preceding freight which had stopped to do some switching, damaging engine, caboose and 2 cars.

13th, on Chicago, Milwaukee & St. Paul, near Palmyra, Wis., engine running a snow plow ran into the rear of a passenger train, doing some damage.

15th, on Philadelphia & Reading, near Gwynedd, Pa., freight train broke in two and rear section ran back down grade and collided with a following freight, the engine and several cars of which were thrown over an embankment and badly wrecked.

16th, on Lake Shore & Michigan Southern, at Springfield, Pa., passenger train ran over a misplaced switch and into a freight train standing on a siding, wrecking the engine and several cars; one trainman injured.

16th, on Baltimore & Ohio, in Chicago, Ill., passenger train ran into the rear of a freight, jamming engine and caboose; one trainman injured. The freight had sent back a flagman, but the runner of the passenger train failed to see him.

17th, on Western New York & Pennsylvania, near Lincoln Park, N. Y., passenger train ran over a misplaced switch and into a car standing on a siding, doing some damage and injuring 2 trainmen.

21st, on Chicago, Milwaukee & St. Paul, at Fulda, Minn., passenger train ran into an engine standing on the main track, disabling both locomotives and damaging a baggage car.

24th, on Pennsylvania, near Lawrence Junction, Pa., a freight ran over a misplaced switch and into the rear of another freight, wrecking an engine and caboose. Seven trackmen in the caboose were injured.

24th, on Oregon Railway & Navigation Co.'s road, near Hot Lake, Or., passenger train ran into the rear of a freight train, wrecking engine, caboose and several cars.

25th, on New York Central & Hudson River, at Palmyra, N. Y., an engine backed into a freight train, throwing 4 cars off the track.

26th, on Louisville, New Orleans & Texas, near Vicksburg, Miss., a freight ran into a preceding freight, damaging engine, caboose and several cars.

26th, on New York Central & Hudson River, at East Albany, N. Y., a Boston & Albany passenger train ran into the rear of a Delaware & Hudson passenger train near the east end of the bridge over the Hudson River. It is said the engineman was inexperienced and did not understand the signals.

27th, on Fitchburg, near Williamstown, Mass., passenger train ran into the rear of a freight, wrecking a caboose and killing 2 trainmen. A man was back with red light and says he placed torpedoes on the track. The engineer heard no torpedoes and saw no red light. He says that in passing through a large snowdrift his face was covered with snow and that it took him several seconds to clear his eyes so that he could see. As soon as he was able to look ahead he saw the red lights of the caboose. The conductor was outside the caboose, and on seeing the danger ran in to warn the brakemen sleeping inside, but was killed, together with one of the brakemen before he could get out.

28th, on Pennsylvania, near Derry, Pa., passenger train ran into the rear of a freight which failed to clear the main track, damaging the passenger engine and an engine helping the freight on to the siding; 1 trainman killed and 1 injured.

28th, on Savannah, Florida & Western, near Sereen, Ga., passenger train ran into a preceding passenger train which had been delayed by a hot box, telescoping the rear car. The wreck caught fire from exploded lamps and 5 cars were burned up.

28th, on New York, Lake Erie & Western, near Hampton, N. Y., a freight train which had broken in two was run into by a closely following freight, doing considerable damage.

29th, on Southern Pacific, in Los Angeles, Cal., a locomotive standing on a siding was run into by freight cars which a yard engine, in making a flying switch, pushed on to the siding at considerable speed, doing some damage.

30th, on Chicago & Northwestern, near Morrison, Ill., a freight ran into a preceding freight in a deep cut, wrecking engine, caboose and several cars, killing the fireman and another man riding on the locomotive.

30th, on Fitchburg, near Hoosac Tunnel Station, Mass., snowplow train ran into the rear of a freight train standing on the main track, wrecking snowplow and engine, 2 cabooses, several cars and a new locomotive in transit. Engineer of snowplow injured.

30th, on Philadelphia & Reading, near Mohrsville, Pa., a freight train ran into a preceding freight, wrecking engine and 15 cars; injuring 2 trainmen.

31st, on Pittsburgh, Cincinnati & St. Louis, near Urbana, O., a "fast mail" train moving at high speed ran over a misplaced switch into a yard engine standing on a siding and both engines and 2 express cars were badly wrecked. 3 trainmen killed and 1 injured. It is said the yard engine was engaged in switching on the main track until the passenger was close upon it.

BUTTING.

2d, on Pennsylvania, near Altoona, Pa., butting collision between a passenger train and a freight; 2 trainmen injured.

2d, on Central Pacific, at Athlone, Cal., butting collision between a passenger train and a freight standing on the main track, demolishing both engines, postal car and 8 freight cars.

3d, on Missouri Pacific, near Harrisburg Station, Tex., butting collision between two passenger trains, damaging both engines; 2 trainmen injured.

3d, on Chesapeake & Ohio, at Olympia, Ky., butting col-

ision between two freights, doing considerable damage; 1 trainman killed and 2 injured.

6th, on Cleveland & Marietta, at Cambridge, O., a butting collision between a freight train and a yard engine, the boiler of the freight engine being exploded by the shock; 2 trainmen fatally and 1 slightly scalded.

6th, on Savannah, Florida & Western, near Meigs, Ga., butting collision between two freight trains, wrecking the engines and several cars. The wreck was partially burned.

6th, night, on New York, Chicago & St. Louis, at Wiloughby, O., butting collision between two freight trains, owing to one of the trains having taken a wrong siding, badly damaged both engines and 8 cars. A man in charge of a carload of apples was injured.

8th, on Philadelphia & Reading, near Lewisburg, Pa., butting collision between two freight trains, wrecking the engines and several cars; 2 trainmen injured.

8th, on Cincinnati, Indianapolis, St. Louis & Chicago, at North Bend, O., the President's car (at the rear of a train) was run into by a passenger train, just as it was going into a siding, and considerably damaged. President Ingalls, his assistant and a trainman were injured.

8th, on Peoria, Decatur & Evansville, near Olney, Ill., butting collision between two freight trains.

9th, on Wabash, near West Lebanon, Ind., butting collision between a passenger train and a freight train, wrecking both engines, mail and several freight cars.

11th, on New York Central & Hudson River, at Holly, N. Y., butting collision between two freight trains, disabling both engines.

13th, on Southwestern, near Fort Valley, Ga., butting collision between two freights, disabling both engines.

13th, on Pittsburgh, Fort Wayne & Chicago, at Conway, Pa., butting collision between a passenger train and a switching freight, damaging the engines and several cars; 1 trainman and 2 passengers injured. Inability on the part of the runner of the passenger train to distinguish the signals, owing to dense fog, is given as the cause of the collision.

15th, on Cincinnati, New Orleans & Texas Pacific, near Oneida, Tenn., butting collision between a passenger train and a freight, wrecking both engines and a mail car. The freight appears to have been using the passenger train's time and to have sent out a flagman to protect itself; but the man did not go far enough.

15th, on Chicago, Rock Island & Pacific, near Ottumwa, Ia., butting collision between a Wabash Western passenger train and an Ottumwa & Kirkville freight train, due to dispatcher's mistake, damaging both engines and several cars; 3 trainmen killed and 1 injured.

16th, on Illinois Central, at Boskydell, Ill., butting collision between two freights, injuring 3 trainmen. The wreck caught fire and was partially consumed.

16th, on the Southern Pacific, at Lathrop, Cal., butting collision between a passenger train and a switching engine, which was just backing out of a siding, wrecked 3 locomotives.

18th, on Chicago, St. Paul, Minneapolis & Omaha, near Hoskins, Neb., butting collision between two empty engines, killing 1 engineer and injuring several other trainmen. The engines were running a snow plow; one of them remained some distance back in order to pull the other out of drifts when it got stalled. The runner of the foremost engine was obliged to leave his plow in a deep cut; he backed out at a considerable speed and met the other engine, which was coming toward him on a curve.

17th, on New York, Lake Erie & Western, near Avoca, N. Y., butting collision between two passenger trains, owing to a dispatcher's mistake, wrecking the engines; 1 trainman killed and 3 injured.

18th, on Northern Central, at Ralston, Pa., butting collision between two freight trains, wrecking both engines and several cars; 1 trainmen killed and 1 injured.

21st, on Chicago, Milwaukee & St. Paul, at Oakwood, Wis., butting collision between two freights.

21st, butting collision between a Northern Pacific passenger train and a Chicago, Milwaukee & St. Paul passenger train, in the yards at St. Paul, Minn., damaging both engines and crushing in the ends of 2 cars. One employé killed and another injured.

21st, on New York, Lake Erie & Western, at Greycourt, N. Y., the rear portion of a west-bound freight moving onto the main track from a siding was run into by an east-bound freight before it had entirely gained the main track, wrecking an engine and 8 cars; fireman badly hurt.

23d, on West Jersey, in Bridgeton, N. J., a freight train ran over a misplaced switch and into the head of another freight, wrecking both engines and 2 cars; 2 trainmen injured.

23d, on Chicago, Milwaukee & St. Paul, near Merrill Park, Minn., butting collision between passenger train and a locomotive, doing considerable damage and injuring 4 passengers.

24th, on New York, Pennsylvania & Ohio, at Lakewood, N. Y., butting collision between a freight train and a switch engine.

24th, on New York, Pennsylvania & Ohio, in Jamestown, N. Y., butting collision between a freight train and a switching freight, wrecking both engines and 4 cars.

25th, on Chicago, Santa Fe & California, near Streator, Ill., butting collision between two freight trains on the bridge over the Vermillion River, wrecking both engines, and killing a fireman.

27th, on Boston & Albany, at Hinsdale, Mass., two passenger trains backed into each other, damaging the rear car of each.

27th, on Charleston & Savannah, near Charleston, S. C., butting collision between two locomotives, damaging both and injuring an engineer.

27th, in Janesville, Wis., butting collision between a Chicago, Milwaukee & St. Paul passenger train and detached engine of a Chicago & Northwestern accommodation train, wrecking both locomotives and telescoping a baggage car.

28th, on St. Paul, Minneapolis & Manitoba, near Lowry, Minn., a snowplow sent ahead of a passenger train got stuck in a snow-drift, and running backwards to get headway, collided with the passenger train, damaging both locomotives and several cars, injuring a trainman and killing a passenger who was caught between the engine and tender.

30th, on Cleveland, Columbus, Cincinnati & Indianapolis, at Muncie, Ind., a passenger train ran into the head of a freight standing on the main track "because the air brakes did not work properly"; engineer of freight train injured. Both locomotives and several cars in each train were badly damaged. The interior of the Pullman cars was considerably damaged by fire.

CROSSING.

10th, an Indiana, Bloomington & Western passenger train was run into by a Pittsburgh, Cincinnati & St. Louis freight train at the crossing near Columbus, O., overturning a sleeping car.

24th, a Missouri Pacific freight ran into a Chicago, Milwaukee & St. Paul freight, at the crossing near Kansas City, Mo., wrecking several cars.

DERAILMENTS.DEFECTS OF ROAD.

3d, on Chicago & Northwestern, near St. Cloud, Wis., 14

cars of a freight derailed and 2 cars wrecked by the breaking of a rail.

3d, on St. Paul & Duluth, at Spirit Lake, Minn., two locomotives pulling a passenger train derailed and damaged by a broken rail.

3d, on Chicago & Northwestern, at Kasota, Minn., passenger train derailed by a defective switch.

6th, on Peoria, Decatur & Evansville, near Olney, Ill., passenger train thrown from the track by the spreading of the rails, the engine and tender being turned over into the ditch.

7th, on Delaware, Lackawanna & Western, near Kanona, N. Y., engine and 20 cars of a freight derailed by a broken frog.

7th, on Alabama Great Southern, near Irondale, Ala., engine and 2 cars of a passenger train derailed and ditched by the spreading of the rails; 2 trainmen injured.

10th, on Toledo, Columbus & Southern, at Findlay, O., several cars of a passenger train derailed and damaged by a broken rail.

11th, on Missouri Pacific, near Jefferson, Tex., 3 stock cars in a freight train ditched by a broken rail, killing a number of cattle.

12th, on Arkansas Midland, near Helena, Ark., passenger train thrown from the track by a broken rail, injuring 2 passengers.

12th, on Charlotte Columbia & Augusta, near Hickory, S. C., a freight train, consisting of engine and 3 cars, went through a trestle, injuring 2 trainmen. The wreck caught fire and was destroyed.

13th, on Fitchburg, near Jonesville, N. Y., passenger train thrown from the track by spreading of rails, injuring a trainman.

16th, on Central of Georgia, near Thomaston, Ga., passenger train thrown from the track by a broken rail, one of the cars going over an embankment; conductor and 3 passengers injured.

16th, on Texas & Pacific, near Bonham, Tex., passenger train derailed on a trestle by the spreading of the rails.

16th, on Chicago, Kansas & Nebraska, near Willard, Kan., owing to a broken rail 3 cars of a freight were derailed and ditched; 1 passenger injured.

16th, on Oregon Railway & Navigation Co.'s road, near Nolin, Or., 10 cars of a freight derailed by a defective frog; 1 trainman killed.

16th, on Oregon Railway & Navigation Co.'s road, at Huntington, Or., freight train derailed by a defective switch and several cars wrecked.

17th, on Lake Erie & Western, near Bluffton, O., 2 cars of a passenger train derailed by broken rail and thrown over on their sides and dragged some distance; 1 passenger killed and 8 injured. The overturned cars caught fire from the stove, but it was soon put out.

17th, on Northern Pacific, at Watab, Minn., passenger train derailed and engine wrecked by a broken rail.

17th, on Wabash Western, near Coatsville, Ia., a passenger train ditched by a broken rail, injuring 13 passengers.

18th, on Chicago, Milwaukee & St. Paul, near Centre Junction, Ia., freight derailed by spreading of rails, ditching the greater portion of the train and doing considerable damage.

18th, on Cincinnati, Jackson & Mackinaw, near German-town, O., baggage and smoking car of a passenger train were derailed by spreading of rails, and after running along on the sleepers for some distance the former was thrown off a 20 ft. trestle; 2 trainmen injured.

19th, on Central Iowa, near Hampton, Ia., a bridge gave way under a passing freight and 5 cars went down with it and were wrecked.

21st, on Union Pacific, near Oketo, Kan., 2 cars of a passenger train were derailed and thrown down an embankment by the breaking of a rail, injuring 8 passengers. The derailed cars caught fire from the stoves, but the passengers quickly extinguished the flames with snow.

21st, on St. Paul, Minneapolis & Manitoba, near Donnelly, Minn., all the cars of a passenger train were thrown from the track by a broken rail and 2 of them thrown over on their sides; 1 trainman killed and several passengers injured.

21st, on Jeffersonville, Madison & Indianapolis, at Manilla, Ind., a freight train was thrown from the track by a broken rail and 11 cars were piled up in a bad wreck, killing a trainman. Two adjoining buildings were damaged.

22d, on Milwaukee, Lake Shore & Western, near Kaukauna, Wis., freight train derailed and 5 cars wrecked by the breaking of a rail.

23d, on Central Vermont, near Royalton, Vt., rear car of a passenger train was derailed and thrown down an embankment by a loose switch rail, injuring 2 passengers.

23d, on Boston & Maine, at Warren Summit, N. H., car in passenger train thrown from the track by a broken rail.

24th, on Lake Erie & Western, near Bluffton, O., passenger train thrown from the track and several cars damaged by the breaking of a rail; 1 passenger killed and 9 injured. The cars caught fire, but no one was burnt.

25th, on Georgia Pacific, in Tallapoosa, Ga., 2 cars of a freight derailed by the breaking of a guard-rail. One car overturned, killing a brakeman.

25th, on Burlington & Missouri River, at Red Cloud, Neb., several cars of a passenger train derailed by defective switch.

26th, on Chicago, St. Paul & Kansas City, near Ouray, Ia., two locomotives of a passenger train were thrown from the track by the breaking of a rail, and went through a culvert, injuring 4 trainmen.

27th, on Pennsylvania, near Mt. Joy, Pa., passenger train derailed by a broken frog.

27th, on Pittsburgh, Fort Wayne & Chicago, in Lima, O., passenger train thrown from the track by a broken rail.

28th, on Housatonic, at Housatonic, Mass., work train derailed in the snow by a broken frog; several employés were injured.

28th, on Detroit, Grand Haven & Milwaukee, near Durand, Mich., passenger train running at high speed thrown from the track by a broken rail, the baggage, express and smoking car overturning and injuring several passengers.

28th, on Maine Central, at Augusta, Me., engine and tender of a passenger train derailed by a defective switch.

28th, on Pittsburgh, Fort Wayne & Chicago, near Delphos, O., 17 refrigerator cars of a freight were derailed and wrecked by a broken rail.

29th, on Missouri, Kansas & Texas, near Walker, Mo., passenger train thrown from the track by a broken rail, injuring a trainman.

29th, on Louisville, New Orleans & Texas, at Cary, Miss., 10 cars of a freight derailed by a defective switch and piled up in a bad wreck, killing 3 tramps.

29th, on Boston & Maine, near East Harrisville, Me., passenger train thrown from the track by the spreading of the rails.

29th, on Syracuse, Geneva & Corning, at Reading Centre, N. Y., freight train ditched by a broken rail.

DEFECTS OF EQUIPMENT.

2d, on New York, Lake Erie & Western, at Cameron Mills, N. Y., a wheel under the tender of a freight engine broke and 16 cars were derailed and wrecked, some of them going over an embankment.

2d, on Delaware, Lackawanna & Western, near Leicester, N. Y., 5 refrigerator cars in a freight train were derailed and badly damaged by the breaking of a wheel.

3d, on Central of Georgia, near Athens, Ga., an axle under a freight car in a mixed train broke and several cars were derailed and dragged some distance over the sleepers.

10th, on Boston & Maine, near Haverhill, Mass., the two rear cars of a passenger train running about 20 miles an hour were derailed by a broken wheel and crashed into a tank house adjoining the track: the supports of the iron tub were broken and it fell upon and crushed the cars; 7 passengers killed and 13 injured, five of whom afterwards died. A section man eating lunch in the tank house, together with a man visiting him, were also killed.

12th, on Southwestern, near Geneva, Ga., 12 cars of a freight derailed and badly damaged by the breaking of an axle.

12th, on New York Central & Hudson River, near Staatsburg, N. Y., 17 cars of a freight derailed by a broken axle. An engine on an adjoining track was struck by some of the derailed cars and disabled.

16th, on Louisville & Nashville, near Brentwood, Tenn., 5 cars of a freight derailed and badly wrecked by a draw-head pulling out and falling upon the track.

18th, on Cincinnati, Hamilton & Dayton, near Cincinnati, O., 5 cars of a passenger train derailed and damaged by the breaking of a wheel.

20th, on Boston & Lowell, near East Concord, N. H., passenger train derailed and locomotive upset by the breaking of a wheel of its forward truck; engine badly damaged; engineer and fireman injured.

21st, on Boston & Lowell, at Amherst, N. H., passenger train derailed and damaged by a broken tender wheel.

23d, on West Jersey, at Malaga, N. J., a car in a freight derailed by a broken axle.

27th, on Boston & Maine (White Mountain division), at Meredith, N. H., a snow plow pushed by three engines was broken, and the engines "went through it." A passenger train stopped so suddenly on encountering this obstacle that passenger was thrown upon the stove and severely burned.

27th, on Central of Georgia, near Macon, Ga., 12 cars of a freight were derailed and badly wrecked by the breaking of a wheel.

28th, on New York Central & Hudson River, in Utica, N. Y., a car in a freight train ditched by a broken wheel.

28th, on Pennsylvania, at Hollidaysburg, Pa., car in passenger train derailed by broken wheel.

29th, on Chicago & Alton, near Vandalia, Mo., freight train derailed and several cars wrecked by the breaking of an axle.

30th, on Central Vermont, at Essex Junction, Vt., all the cars of a passenger train were derailed by the breaking of a wheel under the tender.

31st, on Boston & Lowell, at Andover Centre, N. H., a car in a freight train derailed by a broken truck.

31st, on New York Central & Hudson River, at Weedsport, N. Y., several cars of a freight derailed by a broken truck.

31st, on New York, Chicago & St. Louis, near Fostoria, O., freight train derailed by the breaking of a wheel under a refrigerator car.

31st, on New York Central & Hudson River, at Hudson, N. Y., owing to a broken wheel a car of a passenger train was derailed and thrown across the track, the occupants being severely shaken.

31st, on Fitchburg, in Hudson, Mass., engine of passenger train derailed by the breaking of an axle.

NEGLIGENCE IN OPERATING.

8th, on Chicago, Santa Fe & California, at Carrolltown, Mo., a freight train ran over a misplaced switch and was badly wrecked; 2 trainmen killed.

9th, on New York Central & Hudson River, near Akron, N. Y., 3 cars of a switching freight broke loose and went through an open switch.

10th, on Manhattan Elevated, near Chatham Square station, New York City, the rear truck of a pay car was derailed at a switch, blocking the track for some time. The switchman, who was in a tower some distance away, turned the switch under the train.

11th, on Pittsburgh, Cincinnati & St. Louis, at Camp Hill, O., a coal train in backing into a side track was derailed by a misplaced switch, several cars being thrown over an embankment into the river.

12th, on Union Pacific, near St. Elmo, Col., an ore train could not be controlled and ran down a steep grade at very high speed for some distance, when the engine and 14 cars were derailed and badly wrecked; 2 trainmen killed.

19th, on Northern Pacific, owing to slippery rails, locomotive going down the Stamped switchback became unmanageable and was thrown against the rocks at the end of the switchback and badly wrecked; engineer and fireman injured.

21st, on Syracuse, Geneva & Corning, at Angus Switch, N. Y., a portion of a freight train was backed off the end of a switch, doing considerable damage. The brakeman was unable to throw the switch quick enough.

23d, on Union Pacific, at Gardner, Neb., freight train derailed by a misplaced switch and several cars wrecked.

24th, on New York, Chicago & St. Louis, in Cleveland, O., 3 cars of a switching freight went through an open draw, and were completely wrecked.

25th, on Atlantic & Pacific, near Pineveta, Ariz., passenger train broke in two just ahead of the sleeping cars and the detached portion ran back down grade some distance, finally jumping the track and going over an embankment, injuring several passengers.

26th, on Lake Shore & Michigan Southern, in Dunkirk, N. Y., passenger train derailed by a misplaced switch.

28th, on Burlington & Missouri River, near Cambridge, Neb., passenger train derailed and ditched by a misplaced switch, injuring 2 trainmen and 4 passengers.

29th, on Lake Shore & Michigan Southern, near Pine Station, Ind., a culvert on which repairs were in progress gave way under a passing freight, wrecking engine and 12 cars; brakeman killed. A torpedo was placed at a safe distance, but it is stated some mischievous person had removed it.

30th, on Southern Pacific, near Gage Station, Tex., passenger train derailed at a point where a rail had been removed for repairs, injuring a trainman and a passenger.

UNFORESEEN OBSTRUCTIONS.

2d, on Oregon & California, near Riddle, Ore., a passenger train ran into a landslide, damaging an engine and several cars; 2 trainmen injured.

5th, on Norfolk & Western, near Eggleston Springs, Va., a freight train ran into a landslide, derailing the engine and 24 cars, most of which went over a bank and into a river; engineer drowned, fireman and a tramp killed, 1 brakeman injured.

5th, on Pennsylvania, at Shamokin, Pa., a passenger train derailed by a timber wedged in the track.

7th, on West Shore, near Frankfort, N. Y., engine and several cars of a west bound freight were derailed and thrown down an embankment by the wrecking of an east-bound freight, which had been thrown over so as to foul the opposite track.

10th, on Northern Pacific, near Grey Cliff, Mont., passenger train derailed in a snow drift, the entire train running free from the track upon the prairie, leaving the road unobstructed. The locomotive was upset and the tender piled on top of it. Engineer and fireman killed.

13th, on West Virginia Central & Pittsburgh, near Cumberland, Md., engine of a freight thrown from the track and upset by ice on the track, injuring 2 trainmen.

14th, on East Tennessee, Virginia & Georgia, at Forestville, Ga., freight train derailed by a purposely mis-placed switch, wrecking engine and 7 cars; 3 trainmen injured.

16th, on Pennsylvania, near Erinston, N. J., passenger train struck a large iron truck which had fallen from a passing freight train and lodged between the double tracks; engine and several cars damaged.

16th, on Kentucky Central, near East Maysville, Ky., a construction train ran over a cow and the engine and several cars were derailed and wrecked, injuring 2 trainmen and 2 laborers.

18th, on Columbus & Western, near Goodwater, Ala., a mixed train ran into a landslide and was wrecked; 1 trainman killed and 3 passengers injured.

19th, on Asheville & Spartanburg, near Inman, S. C., engine of a passenger train derailed by running over a cow; engineer injured.

19th, on Columbus & Western, near Frammel's Station, Ga., passenger train ran into a landslide, killing engineer.

19th, on Columbia & Greenville, near Alton, S. C., passenger train ran over a cow, derailing the entire train; engineer injured.

27th, on Boston & Albany, near Gilbertville, Mass., passenger train derailed by snow.

27th, on Central Vermont, at East Clarendon, Vt., one engine and 3 cars of a "double-headed" passenger train derailed by snow.

27th, on Boston & Albany, near Pittsfield, Mass., 2 engines drawing a passenger train were both derailed by snow.

28th, on Pennsylvania, at Riegelsville, N. J., 12 cars of a coal train were derailed and badly damaged by a snow-clogged switch.

29th, on Knox & Lincoln, at Tamariscotta, Me., a train consisting of snowplow, engine and passenger cars derailed by snow, damaging a bridge.

28th, on New York, Ontario & Western, at Liberty, N. Y., snowplow run by two engines was derailed in a snow-drift and thrown over on its side, badly damaging forward locomotive; 4 employés on snowplow injured.

31st, on Louisville & Nashville, near Jellico, Tenn., a freight ran into a landslide, ditching engine and several cars; 3 trainmen injured.

UNEXPLAINED.

2d, on Natchez, Jackson & Columbus, in Red Lick, Miss., 2 cars of a freight were derailed and wrecked.

3d, on Covington & Macon, in Monticello, Ga., several cars of a freight train derailed and damaged.

3d, on Saul Centre & Northern, near Saul Centre, Minn., a car in a passenger train derailed and thrown down an embankment; 2 passengers injured.

5th, on Southwestern, near Montezuma, Ga., 15 cars of a freight train were derailed and damaged.

5th, on Michigan Central, near Ogeman Springs, Mich., engine and 4 cars of a freight derailed and wrecked; 1 trainman killed and 2 injured.

5th, on Sylvan, at Woodcliff, Ga., a freight car in a mixed train was derailed and stripped off its trucks. The platform of a passenger car next to the derailed car was badly damaged, injuring 2 passengers.

6th, on Jacksonville, Tampa & Key West, near Jacksonville, Fla., engine and 10 cars of a freight derailed and considerably damaged; 1 trainman injured.

6th, on Illinois Central, in New Hartford, Ia., several cars of a freight derailed and wrecked.

7th, on Pittsburgh, Ft. Wayne & Chicago, near Crestline, O., a car in a freight train derailed.

8th, on Louisville & Nashville, at Wilder's Station, Ky., sleeping car in a passenger train derailed, injuring 1 passenger.

9th, on Connecticut River, at Chicopee, Mass., a freight train was derailed near a bridge. The engine and 6 cars ran across the bridge on the sleepers.

10th, on Central Iowa, at Grinnell, Ia., yard engine derailed and overturned, injuring the engineer.

11th, on Atlantic & Pacific, near Coolidge, N. M., rear car of a passenger train derailed and overturned, injuring 3 passengers.

12th, on Boston & Providence, at Forest Hills, Mass., rear car of a passenger train derailed and thrown crosswise the track, severely injuring the street crossing gate tender, who was in his cabin.

13th, on Pennsylvania, in Philadelphia, Pa., engine and 3 cars of a freight train derailed at a frog.

14th, on Pennsylvania, near Bedford, Pa., several cars of a coal train derailed and damaged.

15th, on Kentucky Central, at Cunningham, Ky., freight derailed and 1 car wrecked, killing 16 mules.

16th, on Old Colony, near Plymouth, Mass., a car of a passenger train derailed.

16th, on Pittsburgh, Cincinnati & St. Louis, in Pittsburgh, Pa., caboose and one car of a freight derailed and thrown off a bridge, injuring a trainman.

17th, on Atchison, Topeka & Santa Fe, near Emporia, Kan., passenger train derailed.

18th, on Missouri Pacific, near Jefferson, Tex., passenger train derailed and several cars rolled down an embankment; 1 trainman and 6 passengers injured.

18th, on Illinois Central, near Scale's Mound, Ill., the last two cars of a passenger train were derailed and ditched; 1 trainman and 5 passengers injured.

19th, on Pittsburgh, Fort Wayne & Chicago, near Beaver Falls, Pa., freight train derailed and several cars badly damaged.

19th, on Baltimore & Ohio, near Plymouth, O., passenger train derailed, doing some damage.

20th, on Peoria, Decatur & Evansville, near Olney, Ill., freight train derailed and several cars wrecked.

20th, on St. Paul, Minneapolis & Manitoba, near Donnelly, Minn., passenger train derailed; 1 trainman killed and 2 passengers injured.

21st, on Northern Pacific, near Fergus Falls, Minn., caboose of a snowplow train was derailed, injuring conductor and 3 laborers.

23d, on Delaware & Hudson Canal Co.'s road, near Baxerville, N. Y., 3 cars of a passenger train were derailed while running at high speed on a curve, and thrown down an embankment, injuring 16 passengers, 4 seriously.

23d, on Southern Pacific, near Tebachapi Summit, Cal., a car of a passenger train derailed.

24th, on Maine Central, near Etna, Me., passenger train derailed and 2 cars overturned; 2 passengers injured.

25th, on Southern Pacific, at Pomona, Cal., 3 refrigerator cars in a freight train were derailed and ditched.

25th, on Mobile & Girard, in Columbus, Ga., coal car in a freight train derailed.

26th, on Duluth, South Shore & Atlantic, at Greenwood, Mich., snowplow train derailed.

26th, on New York, Pennsylvania & Ohio, near Medina, Pa., engine of a freight derailed and disabled.

27th, on Fitchburg, near Charlemont, Mass., snowplow train derailed.

27th, on Boston & Maine, at Hancock Junction, N. H., snowplow derailed.

27th, on Boston & Maine (Central Mass.), at Amherst, Mass., snowplow derailed and ditched.
 27th, on Philadelphia & Reading, at Royestard, Pa., freight train derailed.
 27th, on West Shore, near West Camp, N. Y., a stock train, consisting of 6 locomotives and 12 cars, was derailed, 4 cars going over an embankment.
 27th, on New York, Lake Erie & Western, at Forest City, Pa., a car in a freight train derailed, damaging engine of a freight on an adjoining track.
 27th, on Chicago, Milwaukee & St. Paul, near Escanaba, Mich., car in freight train derailed and damaged.
 28th, on Pittsburgh & Lake Erie, at Montour Junction, Pa., several cars of a freight derailed on a siding.
 28th, on Pittsburgh, Cincinnati & St. Louis, in Dayton, O., 2 cars of a passenger train derailed, one of them being thrown on its side.
 28th, on Pittsburgh & Castle Shannon, near Castle Shannon, Pa., several cars of a freight derailed.
 28th, on St. Johnsbury & Lake Champlain, near St. Johnsbury, Vt., snowplow derailed, injuring an employé.
 28th, on New York, Chicago & St. Louis, near Silver Creek, N. Y., a car of a freight derailed on a trestle. It ran the length of the trestle on the sleepers.
 29th, on California Southern, near Sorrenton, Cal., freight train derailed on a trestle, wrecking 5 cars.
 29th, on New York Central & Hudson River, near Corfu, N. Y., a car of a freight derailed.
 30th, on Atchison, Topeka & Santa Fe, near Deming, N. M., passenger train derailed and several cars badly damaged; engineer killed.
 30th, on New York & Greenwood Lake, in West Orange, N. J., locomotive and 1 car of passenger train derailed on a curve.
 30th, on New York Central & Hudson River, in Utica, N. Y., several cars of a freight derailed.
 31st, on Rome, Watertown & Ogdensburg, near Somerset, N. Y., passenger train derailed and several cars overturned; 1 trainman killed and several passengers injured.
 31st, on Chicago & Northwestern, near Rochester, Minn., 10 cars of a freight derailed and wrecked.

OTHER ACCIDENTS.

18th, on New York, New Haven & Hartford, at Springfield, Mass., a passenger train ran into the buffer block in the station, "the air brakes failing to hold;" the pilot was damaged.
 18th, on Chicago, Milwaukee & St. Paul, at Egan, Dak., boiler of a passenger locomotive exploded, killing a fireman.
 18th, on New York, New Haven & Hartford, in West Stratford, Ct., engine of a passenger train broke a driving axle.
 22d, on Baltimore & Ohio, near Washington, D. C., engine of a passenger train broke a parallel rod, badly damaging the cab and cutting off the steam pipe from the boiler to the air pump.
 24th, on Illinois Central, near Waterloo, Ia., engine of passenger train broke a parallel rod, injuring engineer.
 24th, on California Central, near North Cucamonga, Cal., draw-head of car in passenger train pulled out.
 24th, on Chicago & Atlantic, near Hepburn, O., parallel rod of passenger engine broke and demolished the cab, killing the fireman.
 26th, on Boston & Albany, at Springfield, Mass., engine of passenger train broke a tender axle.
 23th, on New York, New Haven & Hartford, near Yalesville, Conn., engine of passenger train broke crank pin and blew out a cylinder head.
 27th, on New York, Lake Erie & Western, at Elmira, N. Y., engine of a passenger train broke a tender axle.
 27th, on Western of Alabama, at Benton, Ala., a car in a freight train stripped off its trucks.
 28th, on Lebanon & Lancaster, near Lebanon, Pa., an engine engaged in bucking snow was badly broken and the engineer was injured.
 30th, on Atchison, Topeka & Santa Fe, near La Junta, Col., a car loaded with thoroughbred cattle was found in flames when the train arrived, and it was entirely burned up. It is supposed that the fire originated by sparks from the engine catching in some baled hay in the car.
 30th, on New York Central & Hudson River, in Utica, N. Y., the doors of a portion of a freight train were torn off by derailed cars projecting from the opposite track.
 30th, on Cleveland, Columbus, Cincinnati & Indianapolis, near Delaware, O., engine of a passenger train broke a driving axle.
 31st, on Boston & Maine, in Boston, Mass., the driving axle of the engine of a passenger train broke.
 A summary will be found in another column.

Single Cord Locking Belt Shifter.

The accompanying illustrations show a form of belt shifter invented by Mr. F. A. Shoemaker, and made by J. W. Dennis & Co., Buffalo, N. Y.

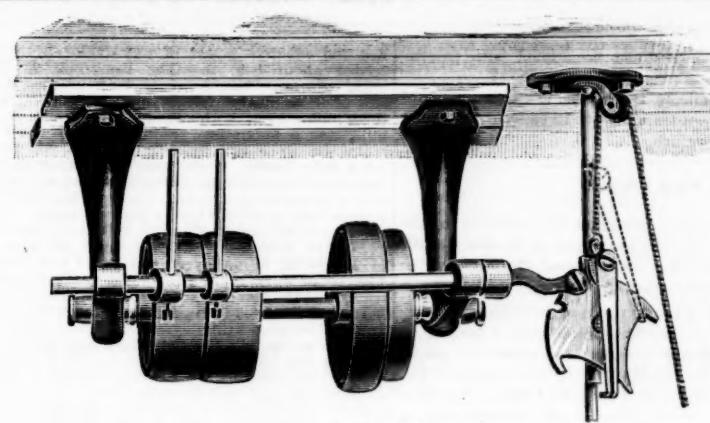
The operation of this shifter is clearly shown in the front view. A counter weight hook or pendulum suspended from the lower end of the slide or lock engages with the hooks on the circular plate when the cord is pulled, causing the plate to reverse as far as the pins (shown in back view) will permit. When the cord is released the slide falls down until the front edge of the slide engages in the notch of circular plate, and allows the pendulum to fall past, the pointed end of circular plate being then in position to reverse the shifter rod at the next operation. No collars are required on the rod where this shifter is used.

In using this shifter for belts or clutches it seems impossible to make a mistake, as but one cord has to be pulled but one way, as the shifter is a simple reverse motion, and the cord can be led anywhere in the shop most convenient for the operator. The shifter is always locked while not shifting, thereby preventing machinery starting or stopping unless the cord is pulled.

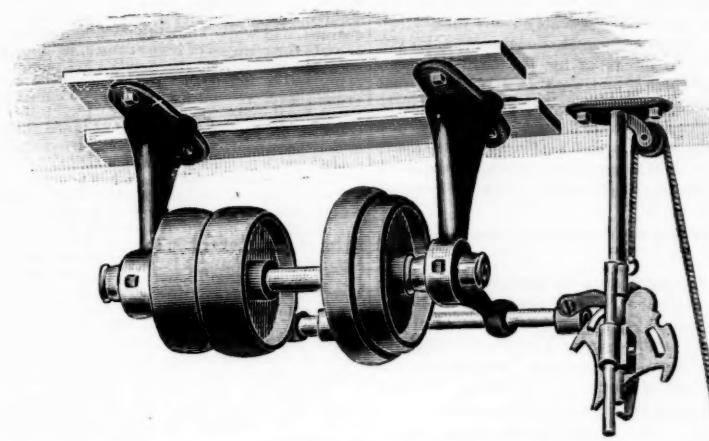
The Williams System on the Pennsylvania.

During the past winter, in experiments on various roads with heating cars by the use of live steam from the engine, it has been discovered almost without exception that during the coldest weather a greater pressure has been required than was at first supposed necessary, the gauges indicating from 25 to 75 lbs. pressure per square inch. The use of these high pressures is probably rendered necessary by defective circulation, for it is well known that low-pressure steam can be very effectively utilized for heating purposes.

Three different methods of insuring a circulation are used



Front View.



Back View.

SINGLE CORD LOCKING BELT SHIFTER

Made by J. W. DENNIS & CO., Buffalo, N. Y.

in the different systems of continuous heating now before the public. The simplest method is to leave open the pipe at the end of the train. The next and most generally used method is to trap off the condensed water, and as this escapes, steam flows from the engine to take the place of the condensed steam. This method is that generally used in heating buildings. The third method is to use a return line of pipes leading to a vacuum pump. As the pressure in the return pipe decreases the condensed water is re-evaporated, and consequently the pipes practically contain nothing but steam instead of a mixture of steam and water. This third method has been found to act very efficiently in heating large buildings, and appears to be the most certain and effectual means of establishing a circulation. The first two methods have been extensively used with the different systems of continuous heating for passenger trains, but the third system has as yet been but little tried. Possibly this is owing to the fact that two distinct lines of pipe are required throughout the entire train; but several examples of the first and second methods of circulation are also fitted with two lines of pipe, and two hose and couplings at each end of each car. As these are not absolutely required, and are only useful when one hose fails, the objections to a double line of pipes are not apparently considered serious by many inventors.

Many advantages are claimed for the Williams system of continuous heating, in which a return line of pipe is used. As the condensed steam is re-evaporated in the return system, no water or steam need escape from the train. The former is apt to freeze at stations and the latter is always annoying.

It is also claimed that traps are unnecessary, and that the low pressure is less severe on the hose and packing.

It is also stated that as a result of keeping the circulation free from water, a temperature far exceeding any required degree of comfort can be maintained with a great deal less pressure than that required by the use of live steam.

A non-official record of some tests made on the Pennsylvania with the Williams system is given below. While the tests were not made in the coldest weather, equally satisfactory results were obtained in the severest weather experienced this winter, although no record was made at the time. These tests were undertaken for the purpose of ascertaining what could be accomplished with very low pressure, no high pressure steam being used at any time. While the pipes in the cars were being heated there was a pressure of from 5 to 8 lbs. per sq. in. and it was shut down to 2 lbs. as soon as all the pipes in the cars were heated, and afterwards, as shown in the table, the pressure did not exceed 2½ lbs. The time required to establish this circulation with low pressure was only 21 minutes.

The condensed water was returned to the tender and was delivered into the tank or let run on the ground as was most convenient.

The following figures showing the results obtained in trials on the Pennsylvania at Altoona, Jan. 31, 1888.

In another recent trial a train of five empty cars was heated with the exhaust steam from the Westinghouse pump. Though the steam was below atmospheric pressure the temperature of the fifth car was easily maintained at 84 degrees. The temperature would, probably, with an equal pressure of

TRIAL OF WILLIAMS SYSTEM OF CONTINUOUS HEATING.

Number and style of car.	Temperature in cars.									Remarks.
	At starting	10 o'clock	11 o'clock	12 o'clock	1 o'clock	2 o'clock	3 o'clock	4 o'clock		
581—Combination...	36	73	84	90	94	98	99	100		Doors and ventilators closed. Heating surface, 240 sq. ft.
875—Coach	36	64	69	70	73	75	76	78		Doors open. Ventilators closed. Heating surface, 240 sq. ft.
732—Coach.....	36	72	W. 71 F. 72	W. 75 F. 76	W. 79 F. 80	W. 79 F. 84	W. 85 F. 86	W. 85 F. 87		Doors closed. Ventilators in one direction open. Heating surface, 240 sq. ft.
19—Combination....	34	71	82	88	93	96	99	101		Doors and ventilators closed. Heating surface, 240 sq. ft.
843—Coach.....	35	54	62	66	70	72	76	78		Doors and ventilators closed. One side piped with 4-in. pipe. Heating surface, 86 sq. ft.
853—Coach.....	33	53	62	68	72	...*	77	79		Doors and ventilators closed. One side only used. Heating surface, 120 sq. ft.
Pressure in train pipe (lbs.) at tender	5 to 8	2	1	2	0	1½	1			Steam turned on at engine and pump started at 9:09 a.m.
Vacuum in return pipe at tender.....	About 25"	24"	23"	23"	20"	21"	21"			Time to establish circulation in six cars (5 to 8 lbs. steam pressure), 21 min.
Pressure in train pipe (lbs.) car 843, 4" vas.....	0	0	0	0	0	36	0	1		Temperature taken just below deck ventilators, except W. at window sill and F. at floor at end of car.
Temperature of atmosphere	20°	....	32°	34°	34°	34°	....			Weather. Fine snow and sleet.
										Total water consumption, 2809 lbs. Consumption per car per hour, 66.88 lbs.
										Temperature of discharge water, 104°-141°. Temperature of discharge water average, 127.14°.

steam, been higher if the cars had been filled with passengers.

These experiments indicate that with a low steam pressure—not over 8 or 10 lbs.—a train of 8 to 12 cars can be heated to any desirable temperature.

Pass Frauds.

On Jan. 20 the following telegram was received by the Vice-President of the Chicago, Burlington & Northern at St. Paul, from Mr. James McCrea, General Manager of the Pennsylvania Co. at Pittsburg:

"I am in receipt of a letter dated at Savanna, Ill., purporting to be written on the official letter-head of the Superintendent of your Dubuque division, and signed by you as General Manager of the C. B. & N. R. R., reading as follows: 'On my arrival from St. Paul here, I find in this office a request from one of our conductors, G. M. Williams, asking me to procure for him a pass over your lines from St. Louis to Columbus, O., and return. Sir, will you kindly grant this favor, and I will be glad to reciprocate at any time called. I go from here to Independence, Mo., on business for our system, which will keep me there for the next ten days. Please acknowledge receipt, and send pass to me at that point, and greatly oblige, Yours respectfully, Geo. B. Harris, General Manager.' The style of the letter, and a comparison with the signature on your annual pass request lead me to believe that the letter is a forgery, and that the information given in this telegram may enable you to catch the forger if my supposition is correct."

On Jan. 28 Mr. Harris received the following letter from Mr. S. H. H. Clark:

"Herewith I enclose application for pass over your name written on letter head of the Chicago, Burlington & Northern Railroad Co., and dated Savanna, Ill., Jan. 26, 1888. From the appearance of the letter am inclined to think the request is not authorized, and therefore forward it to you for disposition. We are, of course, always willing to honor your requests for passes when sure they are genuine."

The letter of application enclosed by Mr. Clark, and referred to by him, reads as follows:

SAVANNA, Ill., Jan. 26, 1888.

S. H. H. Clark, Esq., General Manager Mo. Pac. R. R., St. Louis, Mo.

DEAR SIR: On my arrival here from St. Paul I find at this office an application from one of our conductors, G. M. Williams, requesting me to obtain for him a pass over your line from Kansas City to St. Louis and return.

Will you kindly grant me this favor, and for which I will be pleased to reciprocate at any time called on. I go from here to Independence, Mo., on my own personal affairs, which will keep me there for a few days.

Please acknowledge receipt and send me passes at that point, and greatly oblige

Yours very respectfully,

GEO. B. HARRIS, Esqr.,
General Mgr. C. B. & N. R. R.

Address: Independence, Mo.

By arrangement between Mr. Harris and the gentlemen above named, passes were mailed to the address given at Independence, Mo., and thus led to the arrest on February 4 of James McGowan while in the act of taking from the post office at Independence a letter addressed to Mr. Geo. B. Harris, General Manager C. B. & N. R. R., Independence, Mo. Among McGowan's effects were found letter heads belonging to the following railroads: Atchison, Topeka & Santa Fe, Wisconsin Central, North River Construction Co., Philadelphia Branch of the B. & O., Chicago, Milwaukee & St. Paul, Denver & Rio Grande, Union Pacific & Chicago, Burlington & Northern; also about fifty envelopes printed on the outside, "If not called for within five days return to Chicago, Burlington & Northern R. R. Co.," and others printed "If not called for within five days, return to Chicago, Burlington & Northern R. R. Co., Savanna, Ill." Two memorandum books were also found containing the addresses of about 25 prominent officers of over a dozen roads.

On Feb. 2 the following message was handed in to the operator at Independence:

INDEPENDENCE, Mo., 2, 2, '88.

S. H. H. Clark, Gen. Mgr. Mo. Pac., St. Louis, Mo.: Please answer Mr. Harris' letter requesting a pass for me.

Answer. G. M. WILLIAMS.

This telegram is in the handwriting of James McGowan. McGowan wanted the message sent deadhead, but this was refused.

It should be explained here that G. M. Williams was formerly a roadmaster in the employ of the C. B. & N. R. R., whose service he left in the summer of 1887. Williams is not supposed, however, to have had any connection with these frauds.

On Feb. 9 the case of the State against McGowan was dismissed, and he was immediately rearrested by the Post-office Department. On Feb. 11 McGowan was examined before a United States Commissioner at Kansas City, and bound over to the Grand Jury in the sum of \$750, in default of which he went to jail to await trial next May.

The Bessbrook & Newry Electrical Tramway.*

Although a number of electrical tramways had been constructed in the United Kingdom during the last few years, there had hitherto been no attempt at the regular haulage of minerals and freights, nor at the operation of cars larger than the ordinary street car type. Probably in no case

* Abstract of paper read before the Institution of Civil Engineers by Mr. Edward Hopkins, M. A.

had the effective power of any single electrical motor exceeded about 4 h. p. The Bessbrook & Newry electrical tramway has, however, been designed for the haulage of both heavy freight and passengers, and is over three miles long, with an average grade of 61 ft. per mile, and a maximum grade of 105 ft. per mile. Ten trains are to be run in each direction per day, providing for a daily traffic of 100 tons of minerals and goods, and capable of dealing with 200 tons in any single day, in addition to the passenger traffic. The electrical locomotive draws a gross load of 40,000 lbs. on the up journey, in addition to the tare of the car itself and its full complement of passengers, at an average speed of six miles per hour, and a load of 27,000 lbs. at an average speed of nine miles per hour. The cost of working, as ascertained by six months' trial, does not exceed the cost of steam traction on a similar line.

The line has been in regular daily operation since April, 1886. Two generating dynamos of the Edison-Hopkinson type are driven by a turbine, which is driven by a waterfall near the line. The turbine could develop 62 h. p., and each dynamo was intended for a normal output of 250 volts, 72 ampères, though they were capable of giving a much larger output. The current is conveyed to the locomotive cars by a steel conductor rolled in the channel form, laid midway between the rails, and carried on wooden insulators nailed to alternate sleepers. The conductor is not secured, but simply laid upon the insulators which fit into the channel, and while allowing for longitudinal motion to compensate for changes of temperature, hold it laterally. At one point the line crossed the county road obliquely, the crossing being 150 ft. in length. In this case the conductor on the ground level was not feasible, and an overhead conductor on Dr. John Hopkinson's system was substituted, by which the collector on the car consisted of a bar only, which passed under the supports of the overhead wire, and made a rubbing contact with its under surface. This system had been found to give very satisfactory results in practice.

The locomotive equipment of the line consisted of two passenger cars, each provided with a motor. The body of the car is carried on two four-wheel trucks, the motor being fixed on the front truck, so as to be entirely independent of the body of the car. The longer of the two locomotive cars is 38 ft. in length, and is divided into three compartments, the front one covering the motor, and the two others forming first and second class compartments, together accommodating 34 passengers. The front truck carrying the motor has an extended platform, projecting beyond the body of the car, and communicating by a side door with the dynamo compartment, thus giving the driver direct access to all parts of the driving machinery, which are at the same time entirely boxed off from the passenger compartments. The weight of the locomotive, including the dynamo, is 18,480 lbs.

Apart from the electrical working of the line, an important and novel feature was the plan by which the cars used on the line could also be used on the ordinary public roads, so avoiding the necessity of transhipment, and enabling goods to be loaded at the wharves and drawn to the line by horse power, and again delivered where required. The plan was originally suggested by Mr. Alfred Holt, and had been worked out in a practical form with great success by Mr. Henry Barcroft. The wheels of the wagons were constructed without flanges, with tires $2\frac{1}{4}$ in. wide, which was sufficient for use on ordinary roads. Outside the tramway rails, which weighed 41.25 lbs. per yard, second rails were laid, weighing 23.75 lbs. per yard, with the head $\frac{1}{8}$ in. below the head of the larger rails. The flangeless wheels ran upon these lower rails, the ordinary rails forming the inside guard. The front part of the car was supported on a "fore carriage" or "fifth wheel" which could either be pinned or allowed freedom of motion, as in an ordinary road vehicle. There was a single central coupling arranged to engage in a jaw on the fore carriage, so as to guide it when not pinned. Shafts were attached to the "fifth wheel" when the car or wagon was to be used on the ordinary roads. The cars were of sufficient strength to carry a load of 4,500 lbs., and their weight without the shafts was 2,604 lbs. Experience had shown that the wear and tear, both on the wheels and rails, was not excessive, and that the traction did not much exceed, if at all, that of ordinary trucks with flanged wheels. No difficulty had been found with the horse traction on ordinary roads, and the taking on and off was conducted with great rapidity.

Each locomotive car was fitted with an Edison-Hopkinson dynamo, which was geared by means of helical toothed wheels and a chain to one axle of the truck. The trains were commonly composed of one locomotive car and three or four freight cars or wagons; but frequently a second passenger car was coupled or the number of freight cars increased to six. Thus a gross load of 67,000 lbs. was conveniently drawn at a speed of 6 or 7 miles per hour, on a gradient of 105 ft. per mile. The cars could be reversed by reversing the current through the motor without change of lead; but as there was a loop at each end of the line, reversal was only required when shunting in the sidings. The terminal loop curves were of 55 ft. radius only (104°), but these were traversed by the long locomotive cars with perfect ease, to which the method of carrying the motor dynamo on one truck largely contributed.

Under average conditions of working the total electrical efficiency was 72.7 per cent., the losses being distributed thus: Loss in generator 8.6 per cent., leakage 5.7, resistance of conductor 6.6, motor 7.7. The friction of the bearings in both generator and motor, and the power lost in the driving gear, were excluded from these results.

The cost of haulage per train mile was 6.6 cents over one period of five months, when the freight traffic was light, and 8.4 cents when it was heavier. Since the opening of the line the locomotive cars had run 40,000 miles, the tonnage had exceeded 25,000 tons, and the number of passengers 180,000.

TECHNICAL.

Locomotive Building.

The Baltimore & Ohio has commenced the construction of 25 locomotives at its Mount Clare shops, and it is said will buy as many more.

The Connecticut River has lately received a new 41-ton freight engine from the Schenectady Locomotive Works, Schenectady, N. Y.

The Manchester Locomotive Works, Manchester, N. H., are working full time on a large order for the Atchison, Topeka & Santa Fe.

The Baldwin Locomotive Works, Philadelphia, Pa., have completed a large locomotive for the Georgia, Carolina & Northern.

Car Notes.

The Chattanooga Car Works have received an order for 100 freight cars from the Chattanooga, Rome & Columbus, and 50 coal cars from the Nashville, Chattanooga & St. Louis.

The Southern Car Works, Knoxville, Tenn., have received an order for 100 coal cars from the Waldens Ridge Railroad,

which is operated by the East Tennessee, Virginia & Georgia.

The Delaware, Lackawanna & Western has contracted with the Buffalo Car Works for 100 refrigerator cars.

The Central Car Co., which furnishes the Wisconsin Central with equipment, has voted to increase its capital from \$2,000,000 to \$2,500,000. The additional 5,000 shares will be offered to stockholders on Feb. 15 at par.

The Baltimore & Ohio has made a contract with the Michigan Car Co., of Detroit, Mich., for the construction of 250 Wickes refrigerator cars.

It is expected that the first car from the Elliott Car Works, at Gadsden, Ala., will be turned out in a few days. The company has on hand orders for 300 cars.

The St. Charles Car Co., St. Charles, Mo., is building 50 freight cars of 30-ton capacity, for the Kansas City & Birmingham.

The Dunham freight car door will be put on 200 cars now being built by Carlisle Manufacturing Co. for the Burton Stock Car Co., also on 200 building at the Laconia Car Works for the Eastman Freight Car Heater Co., and on 300 contracted for by Jackson & Woodin.

Bridge Notes.

A bill has been introduced in the United States Senate for the building of a \$35,000 bridge over Rock Creek on the Woodley Lane Road, D. C.

An iron bridge will be built over Pinhook Creek, at Huntsville, Ala., at the cost of the county and city jointly.

A company has been formed at Ormond, Fla., to build a bridge across the Hillsborough River.

The Fort Smith and Choctaw Bridge Co. has been organized with a capital of \$40,000 to build a bridge at Fort Smith, Ark., by H. J. Kayser, W. B. Caudell, B. T. Duval and others.

John Mitchell, of Louisville, Ky., is building the iron bridge across the Cumberland at Pinville, Ky.

Work on the spans of the Poughkeepsie bridge in the river has been stopped until it is possible to drive piles between piers four and five, upon which to erect the false work for the second great truss, but the work on other parts of the bridge is making rapid progress.

Five plans were considered by the Brooklyn Bridge trustees for the increase of the terminal facilities, and the one adopted may yet be modified. This plan provides for a terminus on Sands street, Brooklyn, and furnishes three traffic platforms with room for two more, and permits the simultaneous operation of four trains of six cars each. At the next meeting of the trustees reports are to be considered for the increase of terminal facilities on the New York side of the River.

A bill has been introduced in the Kentucky Legislature to incorporate the Paducah & Illinois Bridge Co., to build a bridge across the Ohio River at Paducah, Ky. Samuel R. Bullock, of New York, Charles Reed and others are the incorporators.

The Carrollton and Prestonville Bridge Co., Carrollton, Ky., is about to erect a bridge for \$60,000 at that place. Further particulars can be learned from J. E. Geier.

The piers of the new bridge across the Cedar River at Waterloo, Ia., are completed. When finished the bridge will cost \$32,300.

Bids are being received for building an iron drawbridge across the Oklawaha River, at Bloomfield, Fla.

The contract to build two iron bridges at Raleigh, N. C., has been let by the county commissioners to the King Iron Bridge Co., of Cleveland, Ohio, at \$8,500.

The Fort Worth & Denver is preparing to build its iron bridge across the Trinity River. C. F. Meek, Denver, Col., is General Manager.

The contract for iron work on the bridge being built across Beach Creek, near Selma, Ala., was awarded to Keepers & Liddell, of Milwaukee, Wis. The contract for bridge work was awarded to A. J. Mullen, of Selma. The cost of the bridge will be about \$4,000.

The contract for constructing the approaches, centre pier and protection pier for the Walnut street bridge over Fox River, in Green Bay, Wis., has been awarded to the Lane Bridge & Iron Works, of Chicago, for \$3,970. The works already had the contract for iron draw, at \$9,490, making the total cost \$13,460.

Plans will be received for rebuilding the Wabash street bridge in St. Paul by City Engineer Rundlett, as it is claimed that the present one is in a dangerous condition.

The Green Bay, Winona & St. Paul is building a new bridge over the Wisconsin River at Grand Rapids, Wis., and has all the piers and one span completed.

The Commissioners of Bent County, Col., will build an iron bridge over the Arkansas River near Caddo.

A survey has been made for a proposed inter-provincial bridge to be built across the Ottawa River near Ottawa, Ont., which is estimated will cost \$125,000. The distance across the river is 700 ft., and with approaches will be 2,000 ft.

The Lehigh Valley Railroad Co. invites proposals for crib work, rip-rap and dredging to be done in Morris Canal Basin, Jersey City.

It is stated that the Erie will soon replace the trestles between Starrucca, Pa., and Thompson, and the one near Ararat, Pa., with iron bridges.

A bridge of three spans across the Mojave River, at Daggett, Cal., has been completed by the San Francisco Bridge Co.

The Louisville Southern will build a bridge across the Kentucky River (point not decided), which will be 255 ft. high and 1,300 ft. long. Plans and specifications are now being made, and the contract will be let as soon as they are completed.

Manufacturing and Business.

The Louisville Asphalt Varnish Co. and the Falls City Varnish Co. have been consolidated as the Collins Varnish Co., of Louisville, Ky. The manufacture of asphaltum varnishes and asphalt iron paints will be continued by the same methods and of the same materials as heretofore.

The Birmingham Equipment Co., of Wyandott Courts, Kan., and Jackson, Mo., has been incorporated with a capital of \$1,000,000, by George H. Nettleton, of Kansas City, and others. The object of the company is the manufacture and buying and selling of railway supplies, locomotives and general equipment properties.

The Johnson Car Seat Co., of Chicago, Ill., has been incorporated with a capital stock of \$30,000 by J. P. Johnson, J. S. Emmert and E. N. Gilfillan.

The Bates Machine Co., of Joliet, Ill., has been incorporated by Albert J. Bates, W. O. Bates and J. Winterbotham, with a capital stock of \$20,000.

The Chattanooga Machinery Co., which removed from Bay City, Mich., to Chattanooga, Tenn., has finished the erection of its new buildings and is ready to receive the new machinery. The main shop is 60×50 and the foundry is 50×40 ft. The firm will make a specialty of wood working and saw mill machinery.

The Louisville Car Wheel Co. has a capacity of 50,000 wheels per annum. Since the commencement of the "Southern boom" this company has been taxed to its utmost capacity to fill its orders.

The American Electric Manufacturing Co. has organized

the American Electric Construction Co., and will hereafter confine itself to the manufacture and sale of supplies.

The Missouri Iron Roofing & Corrugating Co., of St. Louis, has taken a contract which will require 12,000 sq. ft. of its iron roofing.

The Mason Regulator Co., of Boston, has just issued a new illustrated circular, descriptive of its reducing valves for steam car heating, etc.

The National Water Tube Boiler Co. (New Brunswick, N. J.) has just completed the erection of 200 h. p. of their water tube boilers in the new Hazeltine Buildings, Philadelphia, Pa., which will be used for power and heating purposes. They were fitted with the Standard rocking grate bars, in both furnaces.

The following companies have been incorporated in Illinois: The Litchfield Railway-Equipment Co.; capital stock, \$5,000; incorporators, R. J. Whitney, D. O. Settemire and H. H. Beach. The Woodward Railway Supply Co. at Chicago; capital stock, \$5,000,000; incorporators, John M. Brown, M. A. Fletcher and G. L. Kennedy.

Lindley Murray, Jersey City, N. J., and others have incorporated the Safety Automatic Car Heating Co. The capital stock is \$100,000.

The Julien Traction Co., of East Orange, N. J., has been incorporated by William Bracken and others, with a capital stock of \$3,000,000.

The St. Louis agents of H. R. Worthington have lately put in five of their pumps in two new buildings in that city.

The New York Indelible Type Writer Ribbon Co. has perfected a ribbon for type writers and ribbon stamp which is claimed to give a good clear, unfading impression. The Supreme Court of the United States will accept briefs written with this ribbon while rejecting all papers copied with the ordinary aniline ribbons.

The New York Car Wheel Works on Feb. 1 succeeded to the business of Thos. F. Griffin & Sons. All contracts and agreements of the old concern are assumed by the new.

At the annual meeting of the Billings & Spencer Company the old board of directors were re-elected. Chas. E. Billings is President, and E. H. Stocker Secretary.

Chas. A. Schieren & Co., report sales of leather link belt during the past week to the following: Remington Paper Co., Watertown, N. Y.; Westerly Woolen Co., Westerly, R. I.; Chrome Steel Works, Brooklyn, N. Y.; Richmond Mfg. Co., Lockport, M. Y.; Muscogee Mills, Columbus, Ga.; New York Glue Co., Elmira, N. Y.; Carter Cotton Gin Co., East Bridgewater, Mass.; Eddystone Mfg. Co., Eddystone, Pa.

Iron and Steel.

The Union Iron Co. has commenced the construction of extensive blast furnaces, rolling and rail mills at West Duluth, Minn.

The Newport Iron & Steel Works, of Newport, Ky., has been incorporated by H. A. Schriener, Adam Wagner, A. Gahr, James Matthews and R. W. Nelson. The capital stock is \$500,000. This company will operate the Swifts Iron & Steel Works at Newport, Ky., which has been idle for some months.

The rolling mill of the Britton Iron & Steel Co., of Cleveland, which was destroyed by fire recently, will be immediately rebuilt. The new mill will be a duplicate of the old one, and will be equipped with two sheet mills, a bar mill and a plate mill. Much of the old machinery can be restored, but operations can hardly be resumed before May 1.

The Ashland furnaces, at Ashland, Baltimore County, Md., which are operated under lease by the Pennsylvania Steel Co., of Steelton, Pa., have been blown out.

The Roanoke Rolling Mill Co., Roanoke, Va., will want at once machinery for a mill to cost \$100,000.

The Indianapolis Rolling Mill Co., of Indianapolis, Ind., has been awarded the contract to furnish 1,000 tons of steel rails, 60 lbs. per yard, to the Chattanooga, Rome & Columbus.

At the annual meeting of the stockholders of the Crane Iron Co., of Catasauqua, Pa., held last week, the following officers were elected: President, Samuel Dickson; Vice-President, George T. Barns; Secretary and Treasurer, W. S. Pilling.

The Allegheny Bessemer Steel Co. has given notice of an application for a charter under which the present Duquesne Steel Works, Pittsburgh, Pa., will be operated. The incorporators are E. L. Clark, of the Solar Iron Works; H. P. Smith, late of Carnegie, Phipps & Co.; Wm. G. and D. E. Park, of the Black Diamond Steel Works; R. B. Brown, Vice-President of the Duquesne Steel Co., and Geo. Boulton, also connected with the works. The company has bought the newly-erected Duquesne steel plant, and will erect in addition a steel rail mill 350x70 ft. The output will be from 16,000 to 18,000 tons per month, and the capital stock \$600,000. The new mill will give employment to 750 men.

The Columbia Iron & Steel Co. of Pittsburgh, whose works are located at Uniontown, Fayette County, it is said contemplates erecting a 250-ton furnace near the mill to make its own Bessemer pig metal. The construction shops of the same company are working on a \$25,000 contract for the New York Central & Hudson River.

The Etna Rolling Mill of New Castle, Pa., has resumed operations with 12 puddling furnaces.

The Fitchburg has purchased 7,500 tons of 72-lb. steel rails from the Troy Steel & Iron Co.

A Large Gun Car.

A singular car has just been built at Woolwich Arsenal to carry the latest English gun, which weighs 248,640 lbs., or as much as the whole armament of a frigate 30 years ago. The car is supported on twelve wheels in a circle. Eight of these wheels are in two ordinary four-wheel trucks placed near the ends of the car. The remaining four wheels are placed near the centre, each pair of axles having an independent radiating motion. The whole load to be carried, including the chocks on which the gun rests, is nearly 300,000 lbs., and the car passes round curves of 40 ft. radius in the line which passes through the shops of the Arsenal and runs to the proving butts.

One of the Tanite Co.'s Diamonds.

The Tanite Company sends us an interesting note concerning one of the diamonds used in turning its emery wheels. This stone has been described before. After having been cut into the rude form of a brilliant, its table was placed on a diamond polishing wheel for 100 days. The average circumference of that part of the wheel on which it was placed being about $2\frac{1}{2}$ ft., and the wheel going at the rate of 2,800 revolutions per minute, the surface that traveled over the diamond table amounted to over 75,000 miles. At times 4 and 8 lbs. were added to the usual $2\frac{1}{4}$ to $2\frac{1}{2}$ lbs. of the clamp or holder, and for a time 40 lbs. extra were added. The diamond fairly ploughed the wheel, practically ruining it, so that it required planing before it could be further used. No polish was produced, however, sufficient to give the brilliancy necessary in any diamond gem. These experiments were conducted by Messrs. Tiffany & Co., who were the owners of the diamond. The stone thus described was kept by Messrs. Tiffany & Co. as a curiosity in their gem cabinet until November, 1887, when it was bought by the Tanite Co. for use in its turning

room. The first wheel turned with it was a coarse, hard wheel 36 in. in diameter and 8 in. thick. In the turning of this wheel and two much smaller ones the diamond lost $\frac{1}{2}$ carat in weight.

The Simplon Tunnel.

A press dispatch from Geneva states that a Swiss and Italian syndicate has been formed which will advance to the Italian Government 50,000,000 francs to enable it to complete the Simplon Tunnel and the railroad lines which will connect therewith.

Train Heating in France.

A French railroad is trying the experiment of heating passenger cars with gas. Cylinders containing gas are carried on the roofs of cars. The gas is passed through petroleum, and then burned in metal tubes running along the base of the compartments. The results of the experiments that have been made are said to be quite satisfactory.

Magnetism in Watches.

In a paper read before the Western Railway Club at its last meeting, Mr. E. M. Herr, Superintendent of Telegraph of the C. B. & Q., discussed the effects on watches of magnetism of their parts, and the means of providing against it. From the limited number of tests and examinations which he had made he concluded that while various parts of a locomotive are generally found to be magnetized to some degree, the effect is too slight to magnetize the watch of an engineer. This is the first important point ascertained. Nevertheless, an engineer, like any one else carrying a watch, is liable to approach near enough to a dynamo or an electric motor to have his watch magnetized and seriously deranged, and it is important that he should know of the danger and be on his guard. Mr. Herr's experiments with the "anti-magnetic shield," or soft iron case showed that it is a pretty effective protection against magnetism. That is, the protection to a watch carefully guarded in this way is sufficient for the purposes of an engineer, conductor or trainman. Mr. Herr had also examined some of the watches lately made with movements of non-magnetic alloy. These he found entirely unaffected by exposure in the field of the most powerful arc light dynamos.

An Electric Road Cart.

The London *Engineer* illustrates an electric "dog cart" or buggy recently constructed in England, and now attracting much attention in the streets of Brighton. The body of the vehicle is supported by a pair of wheels, and a single wheel takes the place of the horse. It is driven by an Innissch $\frac{1}{2}$ horse-power electric motor. The current is supplied by six small E. P. S. accumulators, their normal discharge lasting six hours. The cells are placed under the seats, and the motor is placed on hangers under the body.

The motor only weighs 40 lbs., but is barely large enough for the work. Valuable experience has, however, been gained as to the amount of power required to propel a vehicle on ordinary roads. On asphalt the tractive force is less than on a grooved rail and a speed of nine miles per hour can be readily obtained, while on soft macadam only three miles per hour is possible. The vehicle with two persons will ascend a grade of 1 in 30. The electric features were designed by Mr. Volk, the well-known electrician.

Car Heating Notes.

The Sewall system of steam-heating has been used on the Old Colony on six cars of the Fall River boat train during the past two months, and it is stated that the results have been very satisfactory, an even temperature of about 70 degrees having been maintained.

THE SCRAP HEAP.

Railroads in Southern Europe.

After the Berlin Congress, an understanding was arrived at between the governments of Austria-Hungary, Turkey, Servia and Bulgaria upon the question of uniting the railroads of Eastern Europe to those of Central Europe. By the terms of the agreement Austria-Hungary undertook to join its system with the Servian system at a point between Semlin and Belgrade. Servia undertook to carry a line as far as Nisch, and from that point to build two branches, one south-east to Zaribrod, on the Bulgarian frontier, and the other southwest to Vranja, on the Turkish frontier. Bulgaria undertook to continue the Servian line from Zaribrod to the frontier of Roumelia, at Vakarel, passing by the way of Sophia. Turkey agreed to carry the line from Vakarel to Mustapha-Pasha, and from Mustapha-Pasha to Constantinople; also to continue the Servian line from Vranja to Uskub, a point on the Salonica line, which has been operated for 14 years by the Ottoman Railroad Co. Financial and other difficulties have prevented the complete carrying out of these plans, so far as Bulgaria and Turkey are concerned. It is expected, now, however, that the Turkish government will make arrangements by which one of two private companies will complete the Uskub-Vranja line, connecting with the Salonica line. That done, the Southwestern system will be completed, and trains can run interruptedly between Vienna, Buda-Pesth, Nisch and Salonica. The *Journal des Transports* predicts a considerable diversion of traffic from the line through Italy via Brindisi to the new road via Salonica. It is probable also that a considerable portion of the import trade of the Balkan country will enter by Salonica rather than by Fiume, Triest or the Danube.

Algerian Railroads.

It is announced that the first rolling stock for the line between Bougie and Beni-Mansour has been delivered—18 wagons and 2 locomotives.

Growth of Southern California Traffic.

The growth of Southern California is shown in the following letter from General Manager A. N. Towne, of the Southern Pacific, in reply to inquiries from the Los Angeles Board of Trade.

A careful calculation shows that the number of freight cars coming west from Ogden during October, November and December, 1887, exceeded the same for a like period in 1886 by 49 per cent. A similar comparison of passenger cars shows an increase in 1887 of 63 per cent. At El Paso the increase was 10 per cent. for freight cars and 28 per cent. for passenger cars. At Deming we received from the Atchison, Topeka & Santa Fe during the period named 134 per cent. more freight cars and 14 per cent. more passenger cars than during the same period of 1886, and from the Atlantic & Pacific at Mojave 31 per cent. more freight cars and 133 per cent. more passenger cars. We are taxed to our utmost capacity, and are unable to meet as promptly as we would desire the demands made upon us. We bad, as we believed, foreseen a large increase of traffic in 1887 over 1886, but it has exceeded our most sanguine expectations. In this connection, I will mention in passing that our company has orders out for 118 locomotives, of which 33 have been received. We have at present 30 passenger trains per day into and out of Los Angeles. Of the total freight received at Los Angeles

in 1887 I find there was an increase as compared with the receipts of 1886 of 210,605 tons, or 77 per cent., there being an increase in through freight of 130 per cent. and in local of 72 per cent., not including company's freight. Comparing the local traffic received at Los Angeles during 1887 with that received by rail at San Francisco during the same period, I find the Los Angeles tonnage exceeds that of San Francisco by 51,302 tons, or an excess of 17 per cent. It should be remembered, however, that in the case of Los Angeles the tonnage given includes a greater proportion of the coarser class of freight, such as coal, lumber, etc., than does that of San Francisco."

Some Results of a Decision of the Inter-state Commission.

The following letter has been sent to the Inter-state Commerce Commission from Faribault, Minn.:

"The Chicago, Milwaukee & St. Paul, immediately after the decision was rendered in the case of the Board of Trades Union against that company, heard by the Commission at Minneapolis, equalized its rates over the two divisions on the basis recommended by the Commission. Two flouring mills in this county, which had been idle for a long time on account of the rates complained of, have since started up, and are now manufacturing about 1,200 barrels of flour a day. The decision has brought to life some of our dead industries; the shipper has received great benefit and the carrier has sustained no loss. We desire to assure you of our entire satisfaction with the principle enunciated in that case, and also to inform you of the beneficial results attending it."

Capture of a Defaulter Employee.

George L. Martin was employed by the Texas & Pacific and Missouri-Pacific companies in the freight office at Dallas, Texas. He was bonded by the American Surety Company of New York, and subsequently defrauded and absconded in January, 1888. He was returned to Dallas, Texas, and there arrested on the complaint of the American Surety Company, and committed for trial at the March, 1888, term of Court.

One Way of Building Up a Town.

Findlay, Ohio, whose wonderful supply of natural gas and consequent great increases in manufacturing population we have noticed, still desires a larger growth and has lately held a convention of some 300 land owners of the vicinity, in which they resolved to place one-tenth of this land or an equivalent in money, in the hands of a common pool to be used as a bonus in securing new manufacturers. It is understood that the capitalists interested in the place will continue to subscribe to the stock of new enterprises. The convention also voted to give rights of way to the New York, Chicago & St. Louis and the Cincinnati, Hamilton & Dayton railroads, which will extend their lines to the city. In addition, the City Gas Trustees have decided to give gas to manufacturers absolutely free, only requiring that they pay the cost of laying the pipes to their works. A manufacturing concern which wants more than free land, free fuel and a subscription to its capital stock, must be grasping indeed.

Section Masters' Duties.

The Massachusetts Railroad Commissioners have investigated the killing of four section men on the Connecticut River road, near Holyoke, during the great snow-storm of Jan. 27. A south-bound train was stalled in a cut, and a gang of some 70 men in charge of the roadmaster and two section masters was sent to shovel it out. They had to walk on and across the adjoining main track, and the wind blew so furiously that the air was full of snow. Under these circumstances a south-bound train, which had received telegraphic orders to travel on the left-hand track so as to run around the stalled train, came upon the men so suddenly that four of them at the end furthest from the approaching train failed to get clear of the track. The train was running about 20 miles an hour, and the engineer applied the brakes several rods before he came up with the men; he could see but a short distance ahead, probably 100 ft., and he was within that distance of the gang before the roadmaster heard the train and shouted to his men to look out. The roadmaster had previously warned each man individually to be specially careful in looking for trains from both directions. They were heavily muffled about the ears, the temperature being below zero. The Commissioners say: "Roadmaster Patch has been in the employ of the road for 35 years, and for 19 years has been roadmaster. He and the section masters are intelligent men and the accident is not due to any shirking on their part. They did all that they thought necessary. In the cold and the blowing, in the struggle to gain the mastery over the drifting snow, they did not fully realize how far the several extraordinary elements in the situation could by combination increase the danger. The accident was due to error of judgment in dealing with a case involving unusual, if not unprecedented, conditions. This accident, and various accidents which have happened during the past winter, suggest that it would be well for the superintendents of the respective roads at the beginning of the winter season to issue a notice to their employees instructing them as to the special precautions necessary to guard against the dangers consequent upon snow-storms, excessive cold and freshets."

Kansas Railroads.

The Railroad Commissioners of Kansas have compiled, from information furnished by the roads, the following table of new mileage built within the state during the calendar year 1887:

Name of road.	Miles built in 1887.	Miles in the state.	Miles operated.
Chicago, Kansas & Nebraska....	841.0	873.0	1,015.0
Kansas City & Pacific.....	79.5	93.0	93.0
St. Louis & San Francisco....	161.8	474.0	1,454.0
Kan. C. Wy. & N. Wes'n.....	111.2	128.2	128.2
Wichita & Western.....	35.4	124.4	124.4
Ottohannock Pacific.....	60.3	902.3	4,164.8
Atch. T. & San Fran.....	584.8	1,888.1	3,825.3
Southern Kansas.....	3.9	65.7	65.7
Kansas City, Ft. S. & Gulf.....	....	296.9	388.6
Kan. C., Clinton & Springfield.....	23.1	174.1	174.1
Missouri Pacific.....	642.0	2,336.0	6,974.0
Burlington & Mo. River.....	35.6	230.4	2,084.0
St. Joseph & Grand Island.....	....	138.0	251.7
Total.....	2,535.5	8,198.1	22,527.8

A Cheap Bumper.

A car coupler inventor, sighing for new worlds to conquer, has devoted his attention to buffer brakes, and believes he has struck a revolutionizer (whatever that may be) in freight brakes at \$10 per head or per car. The balance available for funeral expenses is not stated, but stockholders will probably have the option of taking it out in bumps. One thousand bumps at one cent a piece will, it is said, produce blue, red, yellow, violet, etc., marks on all exposed portions in sufficient quantities to convince the most unbelieving.

"Horrors" in the Office and Out.

Railway Manager—What's the price of coal now? Assistant—Nine dollars a ton. "Humph! Instruct the passenger brakemen to use coal very cautiously. We don't want any more car stove horrors."—*Omaha World*.



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EDITORIAL ANNOUNCEMENTS.

Contributions.—*Subscribers and others will materially assist us in making our news accurate and complete if they will send us early information of events which take place under their observation, such as changes in railroad officers, organizations and changes of companies the letting, progress and completion of contracts for new works or important improvements of old ones, experiments in the construction of roads and machinery and in their management, particulars as to the business of railroads, and suggestions as to its improvement. Discussions of subjects pertaining to ALL DEPARTMENTS of railroad business by men practically acquainted with them are especially desired. Officers will oblige us by forwarding early copies of notices of meetings, elections, appointments, and especially annual reports, some notice of all of which will be published.*

Advertisements.—*We wish it distinctly understood that we will entertain no proposition to publish anything in this journal for pay, EXCEPT IN THE ADVERTISING COLUMNS. We give in our editorial columns OUR OWN OPINIONS, and those only, and in our news columns present only such matter as we consider interesting and important to our readers. Those who wish to recommend their inventions, machinery, supplies, financial schemes, etc., to our readers can do so fully in our advertising columns, but it is useless to ask us to recommend them editorially, either for money or in consideration of advertising patronage.*

There is a sensible disposition to take measures towards restoring rates in the West, and this disposition seems to actuate all, or nearly all parties; but there is as yet little progress toward agreement, for the reason that the problem is really a difficult one.

The railroad map of that whole region has been rapidly growing more and more like a spider's web, and it would be strange if harmony were easily maintained. Railroads now overleap and disregard all natural bounds and obstacles, and an association has difficulty in defining its limits, not to mention holding itself together. It is proposed to merge all the associations west of Chicago in one, but the elements of weakness so nearly offset the advantages that many oppose the proposition. The leading roads insist that an association will be of no value unless all roads join it; this of course involves the Duluth, South Shore & Atlantic, not yet completed, and the St. Paul & Duluth, St. Louis & San Francisco, and other roads which have hitherto acted independently.

The Chicago, Burlington & Quincy is credited with preventing an immediate restoration, because, as it claims, a temporary agreement would do no good; the fundamental questions should be grappled with at once. There are enough of these, the live stock car question, milling-in-transit rates and numerous other problems being of such a nature that the time required to discuss and settle them can only be guessed at. On Wednesday, after a three days' conference with no tangible result, an adjournment was taken until next Tuesday.

The roads east of Chicago seem to be on the alert to prevent, as far as possible, the spread of the confusion into their territory. At a meeting in Chairman Blanchard's office on Tuesday resolutions were adopted to the effect that the agreement with Western lines for percentage divisions is not observed; that manipulation of billing by some Western lines still continues, the same being passed by some Eastern lines; that origin points are not shown; that property is rebilled contrary to the contract at the Mississippi River and other points, resulting in the unjust depletion of the revenue of the Eastern lines and in many instances increasing the revenues of the Western lines above their local rates, and extending their contests into territory of the Eastern associations, contrary to the action of the joint committee; and it was the general sentiment that pro-rating should be stopped. Other resolutions set forth that the rates should be properly adjusted to and from Peoria and other junctions south of Chicago, so that no undue advantage may result, and that proportions of through rates should not be below the Missouri River equalized proportions to and from Chicago, and that rates finally adopted as such proportions should apply uniformly to all northwestern, western and southwestern tonnage in both directions.

Chicago and New York are now both complaining, the same as Boston has complained in previous years, that the wicked devices of the railroads in through

billing are converting them into mere way stations; and the complicated problem will doubtless find its way to the Inter-state Commission before long.

The recent discussion on safe car wheels for passenger service is no doubt caused by the recent disastrous accident on the Boston & Maine at Haverhill, and it is to be hoped that the views elicited will do much to improve the standard of safety as regards wheels, and disseminate much useful information both as to the manufacture of chilled wheels and the construction of steel-tired wheels. Much stress has been rightly laid on the fact that the raw material used must be of good quality. Experience daily proves that iron containing phosphorus is unsafe when exposed to sudden, heavy and repeated stresses or blows, and this especially holds good for both chilled wheels and steel tires. The deleterious effect of phosphorus is clearly understood by users of steel rails and boiler plates, and it is to be hoped that buyers of chilled wheels will also appreciate the fact, and be more careful in purchasing wheels made of poor iron, which is generally the product of ores containing an excessive though apparently minute proportion of phosphorus.

We print on another page a second letter from J. F. H., though we have cut out portions of it, for the reason that his main argument is aimed at the exorbitance of the rates usually prescribed for demurrage. This point we think does not need much discussion. We believe that the honest aim of railroad officers generally is to charge rates just high enough to secure a fair movement of their cars. No one thinks, or pretends to think, that the demurrage penalty is measured alone by what the detained car could earn if it were not detained. It would be useless to fix such a measure. The loss is not only in the service of the car but also in the increased expense of yard work due to an accumulation of cars, and the charge must be sufficient to make the consignees stir around. It is true that not much has been done in the way of modifying the rates; but not much has been done towards collecting *anything* for detained cars. Although the fixing of a reasonable rate is a necessary preliminary to any effective action in this matter we have little doubt that it will be speedily settled whenever the railroad officers gather the courage to grapple with the main question.

The facts concerning the experience of the roads centering in Omaha in the collection of demurrage, which we give on another page, are highly interesting and should be an incentive to more active efforts in a good many localities which are burdened in the same way that Omaha was. Mr. Hill draws a rose-colored picture indeed, but he is evidently borne out by the facts. Without stopping now to critically examine his figures, it is to be noted that the benefits resulting merely from the increased convenience are well worth the effort and the expense incurred, the diminished length of storage tracks required, the added ease in switching, the relief in collections and other clerical work and from complaints of delay and numerous other troubles, constitute an aggregate of advantages which should afford ample inducement to attempt this reform.

The collection of demurrage is not so easy as to resemble toboggan sliding on a 50 per cent. grade even in the exhilarating air of Colorado, it seems. At Denver, where there is an agreement similar to that at Omaha, a big snag has already been encountered, and, according to the newspapers of Feb. 12, was to be taken into the courts. The Omaha & Grant Smelter detained a number of cars and the usual dispute arose as to the actual number of days that should be charged for. Doubtless there were as many allowances from the gross amount as Mark Twain secured in his income tax list after consulting his cute neighbor. On Feb. 14 the roads notified consignees that all demurrage charges to Feb. 11 would be refunded and that on the 18th a fresh start would be made; so that the differences have doubtless been compromised.

The examination of the conductors and enginemen of the Erie on their new rules has afforded some valuable experience. There are a large number of men of various grades of intelligence, the average being doubtless fully as high as on the average large road, and the sudden "change of gauge" which has been wrought in their habits of thought has brought out some valuable lessons. It has shown, first, that an occasional or periodical conference should be held at headquarters simply for the purpose of comparing notes and to guard against possible rustiness of ideas. Intelligent men take different views of very simple things which it would be assumed could

not possibly occasion disagreement. The average conductor or engineman, be he ever so intelligent, lacks the breadth of thought and comprehensive grasp that the trainmaster acquires from his more varied experience, and it is the duty of the latter to impart to his men some of the facts and principles that are learned at headquarters. They should not be left to acquire necessary and vital knowledge through the uncertain medium of roundhouse conferences or smoking-room disputes which are never authoritatively settled. This revision of rules has shown, second (or, perhaps we should have said first), that a great amount of time and care is necessary in imparting a body of two or three hundred rules of this sort to a large number of men. A single question suggests a dozen others, and where men have preconceived notions based on wrong principles, care and skill are necessary to insure that the new teaching is firmly fixed in the mind. It is necessary, first, to give the men the code and allow them time to study it. Then meetings of considerable numbers of men together are desirable so that the friction of mind against mind will enliven their ideas and show them where they have studied erroneously or superficially. Then a subsequent catechising, one at a time, is necessary to clinch the points made. All this takes a great deal of time, and is especially inconvenient when business is active and men are on duty a large share of the time. And this final examination ought to be in writing. Again, the questioners as well as the trainmen need careful attention. A number of men cannot be examined satisfactorily without a form to be used as a guide. The framing of appropriate questions which shall draw out the desired information and not waste time is no easy task. It takes time and skill, and trainmasters and dispatchers should not be left to study out, each for himself, the best forms. Questions which at first are not thought of are shown by experience to be of importance. And this list of questions cannot be a brief one. The art of creating a good impression, of asking questions so as not to wound pride or excite antagonism, is not beneath notice. The idea of examining men in the manner here sketched arose from a conviction that telling a thing is not teaching it. This is or should be axiomatic; but the two are constantly being confused and have been worse confused, perhaps, in railroading than in any other line of activity. This experience of the Erie amply demonstrates the necessity of guarding against this misconception and the errors founded upon it.

In speaking, last week, of the changes on the Erie we omitted to mention the excellent yard limit rule in force on that road. It reads:

"It will not be necessary for any engine or train occupying the main tracks inside of established yard limits to be protected by flagmen except when in the time of a first-class train. All trains must be governed accordingly."

This provision makes a definite dividing line and greatly aids in the enforcement of flagging rules. The old method of requiring trains to approach carefully and at the same time *also* requiring switching engines to protect themselves should be abolished everywhere. The use of the right kind of a rule and the application of it to a sufficient number of stations is an important aid in the enforcement of flagging rules. Perhaps the greatest need in this line on most roads is a definition of the yard limits at a larger number of stations. Except where important time or money (in the shape of fuel) would be lost by reducing from a high to a low speed, the above rule ought to be operative, practically, at every station. Places where there are no switches or where local freight trains have to do switching but infrequently are exceptions, of course; but perhaps these ought to be defined as flag stations or by some distinctive term that would give a clear idea of the difference between them and the ordinary station. "Between the switches" is generally but a poor makeshift definition of yard limits for the reason that trains which most need the benefit of the protection afforded by the rule find themselves unable to take advantage of it. With a suitable number of important stations provided with limit posts between which all trains must be run under control, or, better still, provided with block signals, the use of a rule like the Erie's may be made a valuable promoter of safety: and the millennial time when flagmen will protect their trains under ordinary circumstances as faithfully as they do when the superintendent is in the rear car, ought not to be so far in the future as it has seemed.

In connection with rule 30, the Erie has a sensible provision that if, after running one mile, no danger signal is found, full speed may be resumed.

The East Tennessee, Virginia & Georgia has its code of rules printed in a manner which enables the uniform code proper to be readily distinguished from

other rules or those added to it. All the rules are printed with a margin at the left of the column; in this margin are "side heads," which for the uniform rules are in heavy type, and for the others in letters smaller than those in the body of the rules. In the time-table, the figures for p. m. time are italic, except at meeting and passing points.

A Kansas correspondent writes suggesting the importance of considering, in connection with the subject of uniform coupon tickets, as recommended by the last General Ticket Agents' Convention, the details which are especially important to conductors and ticket sorters. One of the first requirements in a ticket is legibility. Conductors working at night, often by dim lights and in a hurry, deserve all the consideration possible in this respect; and the multitude of jumbled up and poorly printed forms, together with the shabby devices for coloring and lathe-work printing now in use would seem to furnish sufficient warning against that kind of blunder; but this correspondent incloses two stubs, one of which, while fairly well printed in the general features, has the form number in unusually small type. This is a seemingly trifling point, and quite likely the person who accepted a "poor job" from the printer "will not let it occur again"; but the circumstance is a reminder that details, as well as more important features, should be attended to in season. In sorting tickets, coupons or stubs, and in picking out tickets from a case to sell, the form number is the first feature looked for and should therefore stand out prominently.

The Guarantee of Car Wheels.

The car wheel question takes an occasional nap, but it is not allowed to sleep long. It is too important a matter. We may roughly estimate the annual cost of maintenance of wheels on all the railroads of the United States at about \$5,000,000. The damage to track and rolling stock coming from broken wheels cannot be estimated, even so roughly; and the loss of life and limb from the same cause need only be mentioned. It is likely that something like three per cent. of all train accidents in the country are due to wheel failures. Lately the problem of securing better wheels or better service from them has borrowed a new interest from the fact that a joint committee of the Associations of Master Car-Builders, Master Mechanics and Wheel Makers has under consideration a form of specifications and tests, and a system of guarantee, which shall reconcile the present very diverse practice. Car wheels and their tests and guarantee have lately been the topic of discussions in several of the technical clubs. On another page will be found abstracts of papers read at the last meeting of the New York Railroad Club, and last week we published an abstract of a paper by Mr. Lobdell read before the New England Railroad Club. It will be seen that there is considerable diversity of opinion among the various speakers, and inevitably so, as they represent such diverse interests. All agree as to the necessity for better wheels.

The immediate question is not, however, between chilled and steel-tired wheels. Whatever opinion one may hold as to the relative economy and security of the two types, and even if he considers the chilled cast-iron wheel as but a passing error, to be superseded later by some form of steel wheel, yet he is bound to recognize that it is, and for years must be, the standard wheel of the country for freight service. Vastly more cast-iron than steel tired wheels are now used and long will be. That being so, and the defects of iron wheels being not only admitted but notorious, it becomes important to determine how the standard may most effectually be raised.

The idea of a guarantee of mileage, or of time of service, is a familiar one and is put in practice in various ways by different roads. The late Mr. George Whitney believed that the makers should give a limited guarantee, varying with the character of the roads and traffic, and should be credited with the mileage already made by a wheel removed for inherent defects. Mr. Snow suggests a mileage guarantee, the maker to pay at a certain rate per 1,000 miles for the failure of a wheel to come up to the guarantee, and to receive extra payment for the service that is made in excess of the guarantee. Mr. Lauder thinks that, in the near future, wheels will be bought and paid for on a mileage basis, and incidentally he suggests that the maker who sells, or the car-builder who uses, a 550-lb. wheel at \$6.75, should be shot. Mr. Lobdell also thinks that extra payment should be made for a wheel that runs over the stipulated mileage, the rate of payment per mile to increase as the mileage increases. There is an appearance of even justice about the mileage basis which commends

it. Let the railroad company pay nothing for a wheel until it has run enough miles to earn the cost of putting it on, then let the wheel be paid for by the miles run, and, as a wheel that runs 100,000 miles is worth more than twice as much as a wheel that runs but 50,000, let the rate per mile increase by some well-contrived scale, and the maker would be paid for just what he gives and the company would pay for just what it receives. The difficulties of this ideal system of payment are, however, enormous. A prolonged running account must be kept with each wheel, or else the maker must wait, say four years, for payment for it. As wheels are removed they must accumulate in the yards until their records can be written off and closed up. The life of any given wheel will vary according to the conditions of its service. It will be affected by load and speed, by grades and condition of track, by the method of using brakes, by the greater or less duration and intensity of the winter weather in the region in which it is run and, doubtless, by still other conditions. When a wheel fails, who shall determine to what extent its life has been shortened by the faults of the maker and to what extent by the faults of the user? It is obvious therefore that practically it is impossible to fix an average rate of mileage payment that shall be just for all roads and regions. The rate must vary with the road, and the maker who is familiar with the special conditions of service on any one road will constantly find himself underbid by a maker more ignorant. So far as the makers are concerned many of the evils of unbusinesslike competition would continue. To be sure, in any given case the remedy would finally come in the ruin of the ignorant or reckless bidder, but the crop of fools, like that of Canada thistles, is perpetual.

The ideal method of paying for exactly what you get after you know beyond question that you got it being impracticable, a compromise is made in a fixed service guarantee, and payment for service in excess of the amount guaranteed, and forfeit for failure to come up to the guarantee. That is, the maker guarantees, say 50,000 miles, or four years life, at a certain price per wheel. If his wheel makes more miles than 50,000, or endures longer than four years, the maker is paid an additional sum. If, however, the wheel falls short he forfeits either the whole or a part of its first price. The makers urge that even if a wheel does not make the service guaranteed, there should be payment for that part which it does make. This method of purchase really reduces itself, then, to the first method, except that the maker is paid at once the probable full price of the wheel subject to a future accounting. All the other difficulties remain.

Notwithstanding the apparent fairness of the service basis of payment we are not at all sure that it is the best one attainable. It may prove to be, but we doubt it. Under the car is no place to test a wheel. No guarantee that has been suggested, or that is practicable, can compensate for the danger that a broken wheel may do. No system of purchase can take the place of good specifications and rigorous tests. Whatever method of dealing is adopted between the railroads and the wheel-makers the roads must still test their wheels. The question then arises, Is it not better to make the specifications and tests so thorough and conclusive that wheels which pass them may be bought absolutely? The machinery of record and accounting can then be simplified, and the question whether or not a wheel failed from its faults or misuse need not enter. The maker need concern himself only to make a wheel that will stand the test, and the railroad company need concern itself only to know that it buys a good wheel. One great company at least, which has hitherto bought wheels on a guarantee of service now buys them outright, on its own tests, and finds economy and great convenience in the method.

Some Recent Decisions of the Interstate Commission.

The case of W. B. Farrar & Co. vs. E. T. V. & Ga. involves a somewhat unusual ground of complaint, namely, of undue discrimination against the long distance traffic. It appears that the rates on lumber per hundred pounds charged from Dalton, Ga., to various points were as follows:

To Knoxville, 1,0 miles, local rate.....	7 cts.
Bristol, 241 " joint rate.....	11 cts.
Roanoke, 391 " joint rate.....	22 cts.
Lynchburg, 445 " joint rate.....	22 cts.

It will be seen on comparing the Bristol rate with those to Roanoke or Lynchburg, that the mileage rate is greater in the case of the more distant points. This seems to be the result of the cobbling or patchwork process pursued by some freight agents in the efforts to bring their rates into conformity with the long and

short haul clause. Prior to the passage of the act the Dalton-Lynchburg rate was 17 cents per 100; but it seems to have been raised thoughtlessly, without any idea or system, to the level of the highest intermediate rate. The Commission has ordered a reduction of the Lynchburg rate to 18 cents and the Roanoke rate to 17 cents. We imagine that their course will meet with general approval. It certainly is not good railroad economy to increase the mileage rate for long distances; and it is rather a glaring instance to charge 11 cents for the first 241 miles, and 22 cents for a haul on 150 miles longer.

Another case decided last week shows the curious conception which some people have with regard to what constitutes discrimination under the statute. The Danville Chamber of Commerce preferred a series of complaints against the Richmond & Danville Railroad. Some of these complaints referred to individual errors of freight agents, which seem to have been corrected; others referred to violations of the long and short haul clause under tariffs which have since been changed. Stripped of these features, the complaint covered two distinct points. First, that the rates from Lynchburg to Danville were very much greater per mile than the through rates on connecting roads from points in the Northwest to Lynchburg or to Richmond. Second, that the rates from Richmond to Danville plus the rate from Danville to Greensboro or any other point beyond, was greater than the direct single rate for a continuous shipment from Richmond to Greensboro. Of course the Commission dismissed both these complaints. The wonder is, that people should have had the face to make them. The consequences which would follow if the principles of the Danville complaint were admitted would be truly startling. They would be as follows: 1. The rate per mile for through freight on the trunk lines shall be adopted as a standard by all connecting roads. 2. A railroad shall not charge any more for loading and unloading freight twice than for loading and unloading it once. In other words, as Judge Cooley suggests in his opinion, the complainants wish to have a sort of "milling in transit" system made compulsory on all the railroads of the country for all classes of freight.

A case of much more wide reaching practical importance has been dismissed in a few words. This is the complaint of the Boston Chamber of Commerce with regard to the difference between New York and Boston domestic rates from the West. It will be remembered that the complaint was originally based on the fact that there was a difference of treatment between domestic and export goods, the latter being allowed, in one form or another, a rebate of five cents to put them on an equality with goods exported via New York. The Commission decided that there was a difference of circumstances and conditions within the meaning of the act, the matter being complicated by competition of water routes not under the control of the statute. In the present case the basis of comparison is different. It is not between different kinds of rates to the same port, but between the same kind of rates to different ports. The Commission, as might be expected, decide that the circumstances and conditions of the Boston traffic are totally different from those of New York. The roads are different; the grades are different; the character of the consumption is different; the volume of traffic is different. In fact, to attempt to enforce an adjustment between New York and Boston rates would have involved an assumption of the rate-making power of the whole country.

The Commission has decided the second "Jim Crow car" case on the same principles that it did the similar complaint of Mr. Council two months ago; and in fact could not have handled a case involving the vexed question of the social relations of the white and black races in the South in any other way. To say that people of equal respectability shall ride together, would be in the nature of an attempt to enforce impossibilities; to assume that all negroes are fit only for emigrant accommodations would be untrue as well as a violation of the spirit of the law. The practical knottiness of the problem still remains unsolved, for the furnishing of four classes on every train, first and second for whites, and first and second for blacks, would be expensive and involve much inconvenience.

Strains on Wheels and Axles.

Many failures of wheels and axles are still attributed to crystallization, which is by some erroneously regarded as inevitable to the life of iron and steel structures exposed to blows and vibrations. Many so-called cases of failures from crystallization are, however, not the result of any gradual change in the structure of the metal caused by repeated strains. It is

generally acknowledged that a crystalline fracture is often only the effect of the manner in which rupture was caused, and that while a gradually applied stress will produce a fibrous fracture, a sudden blow will show a crystalline structure.

It is often noticed that steel tires and axle rarely fail until they have run some mileage. This is sometimes erroneously attributed to crystallization. The general explanation of such failures is that the steel when new contained a slight flaw and that no fracture could occur until running had gradually extended the flaw to dangerous dimensions, when failure is of course inevitable.

The best living authorities on the effect of repeated strains on iron and steel are agreed that crystallization or fatigue only occurs when the material is strained beyond its elastic limit. As long as the maximum strain falls short of this, crystallization will not occur. It is, however, undoubtedly the fact that the interposition of some elastic or non-metallic substance which deadens the blow will materially increase the life of iron or steel structures exposed to sudden and repeated strains. Experiments with different kinds of wheels running in the same service have shown that the number of broken axles and tires varies according to the rigidity of the wheel centre, and that an elastic wood centre marvellously increases the life of the tires and axles.

That the effect of a blow is materially changed by a cushion or spring is well known, but the effect of a blow on a structure wholly composed of iron or steel and to the ordinary mind entirely rigid is not so clear, for many fail to recognize fully the universal law of nature that every substance is more or less elastic. It is, however, generally admitted that many badly proportioned structures will stand a steady strain, but will collapse under a repetition of the same stress suddenly applied.

This fact may be illustrated by many examples. It is well known that steam hammer piston rods are very apt to break, and that similar rods if used in a steam-engine would have a far longer life. It is evident that the strains on a steam hammer piston rod are sudden and that those on a steam engine piston rod are comparatively gradual and cushioned. This difference in the mode in which the stress is applied is apparently the principal cause of the different behavior of the rods. Steam hammer piston rods are, however, subjected to severe strains caused by side blows on the forging, and doubtless this and not the sudden blow is the cause of many breakages. A clearer example of the effect of sudden blows may be found in the bolts used in securing armor plating to the sides of a vessel of war. As is well known, wood backing is placed behind the armor plate in order to cushion the blow of the shot. The armor plate is secured by bolts, which have a long countersunk head in the armor plate, pass through the backing, and are secured by nuts bearing against the inner side of the iron skin of the ship. Soon after the introduction of armor plating, it was found that these bolts broke whenever a shot struck the plate. The elastic backing was violently compressed and the consequent rebound broke the bolts.

It is instructive to note the method by which these breakages were prevented, as it throws a strong light upon the so-called crystallization which, to some minds, is the all-potent cause of breakage under sudden and repeated strains. As these bolts broke at the first shot, the repetition of strains was not the cause, and most persons acknowledge that crystallization is a plant of slow growth and requires a diet of repeated vibrations.

Elastic washers under the nuts proved insufficient, and an increase in the diameter of the bolts was ineffective. At last an able engineer, Major Palliser, the inventor of chilled shot, suggested that the plain part of the bolt be made smaller, and this proved an effective remedy. The shank of the bolt was turned down until it was a little smaller than the diameter of the root of the thread. The maximum strain per sq. in. was thus distributed over the length of the shank, which was considerable, instead of being concentrated on the very small length at the bottom of the thread. The bolts were, therefore, actually strengthened by being reduced in diameter for a great part of their length. The bolts were then evidently better proportioned for their work, and had evidently failed not from vibration nor from insufficient size, but from bad proportions. As, however, these bad proportions are those of ordinary bolts which answer well under most circumstances, and especially under steady strains, it may be well to explain by a simple example the difference in the effects produced by steady stresses and those produced by the same amount of stress suddenly applied. The difference in effect between a steady pressure and a blow may be forcibly

illustrated by resting the weight of chipping hammer on a chisel and then raising the hammer and allowing it to fall on the chisel.

No such clear distinction between a steady pressure and a blow is possible in considering the strains imposed upon railroad wheels and axles. Running over a rough road, however, produces vibrations which can only be caused by pressures which vary so quickly and so suddenly that they partake of the nature of blows. It may be useful therefore to investigate further the armor plate bolt which is similarly exposed to very suddenly applied pressures.

In considering the case of the armor plate bolt, the office of the bolt may be compared to that of a continuous brake on a moving train. The train has a certain amount of momentum or energy which it is the office of the brake to destroy. It is obvious that the distance in which the train is stopped will vary within certain limits with the pressure on the shoes. The shorter the distance the greater the pressure. If it were impossible to slide the wheels, it is evident that the train could be stopped in a very small distance, but that the pressure required on the brake shoes would be so great that levers, hangers, brake beams and even the wheels, axles and trucks would suffer.

The analogy with the armor plate bolt is evident. The rebound of the hard wood backing corresponds to the energy of the train. The bolt has to fulfill the office of the brake and destroy this energy. The pressure which the bolt can exert for this purpose is its tensile strength. The distance in which the train is stopped is evidently the distance over which the brake shoe pressure is exerted, and, correspondingly, the distance in which the rebound can be checked is the distance which the bolt can stretch while still exerting a stress to check the rebound, or in other words, the distance which the bolt can stretch before breaking. But with a bolt of the ordinary pattern, the stretch must chiefly be in the bottom of one or two threads. The distance was insufficient, as an immense force was required to check the rebound in that short space, and that force materially exceeded the strength of the bolts and consequently they broke.

When, however, the shank was turned down, the bolt could stretch in the shank as well as in the bottom of the thread, and as this distance was sufficient in which to check the rebound the bolts stood.

The lesson to be learnt is obvious. Instead of fearing a bogey crystallization which has but a shadowy existence, let us so proportion iron and steel structures exposed to blows and sudden strains that the maximum strain is not concentrated at one point, like the bottom of a thread, but is distributed over a considerable surface, like the diminished shank of our example, the Palliser armor bolt.

The Iowa Commissioners' Report.

Readers of the Iowa Railroad Commissioners' Report for 1887 will miss the work of Judge McDill, whose term of office has unfortunately ended. This is much to be regretted. With the exception of Mr. Adams, no state commissioner probably has done so much to shape the relations between the railroads and the public authorities to the advantage of both parties. His retirement is specially to be regretted at a time when great wisdom will be needed to prevent destructive legislation with regard to railroad property.

The present report shows clearly enough how little room there is for forced reductions. It is true that if we compare 1887 with 1886 we see a great improvement in financial conditions; it is also true that 1887 in some respects shows an improvement over 1884. The gross earnings of the roads reporting had decreased from \$104,000,000 to \$101,000,000; but the operating expenses had decreased from \$66,000,000 to \$62,000,000, so that there was a gain of a million in net earnings. Unfortunately this slight gain had to be spread over a capital of \$953,000,000, instead of \$830,000,000, and this was sufficient to turn it into a relative loss.

Slight as this net gain is, it is quite remarkable, in view of the reduction in freight rates which has been so constantly going on. Most of it has been obtained by increase in train loads. The freight train mileage in 1887 is a little less than in 1884; the ton mileage has increased 8½ per cent. The average train load has increased from 130 tons to 141 tons; and that, too, in spite of a decrease in average length of haul, which, of course, makes it harder to fill trains to the best advantage. This fact with regard to train loads is one of the most striking things in the whole series of returns; it is one which the Commissioners themselves do not seem to have noticed.

Any saving which is made in this way is an unmixed

good to all parties. There are other things on which the Iowa roads have saved money which are not so good. We note that the maintenance expenditures for motive power and cars, which in 1884 were over \$10,000,000 and in 1886 were still \$9,700,000, have in 1887 fallen below \$9,000,000, a reduction of 7½ per cent. in a year when traffic was increasing. This is specially interesting when taken in connection with the scarcity of cars of which we hear so much complaint. The question at once arises, has the increase of train-loads been obtained by withholding facilities from points where full trains could not be frequently made up? Have the Iowa roads begun to do what is done by so many European roads in utilizing car space at the expense of car movement? These questions cannot be answered without very much fuller statistics of car movement than we have at present. If Commissioner Coffin, in place of his interesting, but not very conclusive, discussion of the reasons for lack of cars, had collected a few facts under the head of car movement, they would have been extremely useful.

As we suggested last week, we suspect that the lack of cars may be due to the lack of paying rates, quite as much as to any other cause. We are confirmed in this view by a fact which is by no means new, but which is not so generally known as it deserves to be. The proportion of loaded cars bound west and north is very much greater than the proportion east and south. The figures in car-miles are as follows:

	Loaded.	Empty.
West-bound.....	359,600,000	94,100,000
East-bound.....	309,900,000	136,000,000

There was the same general fact in 1886, but not so marked in its extent. Without presuming to give a positive opinion on the subject, we should say that it indicated that the Iowa roads were adapting their car-motion to the necessities of the west-bound freight and were letting the east-bound freight take its chances. But this again indicates that there is little or no money to be made on east-bound shipments at present prices; so that any attempt to mend matters by legislative restrictions would only make things worse.

We hope to see additional facts brought out which will throw further light on the question.

January Accidents.

Our record of train accidents in January, given in this number, includes 72 collisions, 151 derailments and 16 other accidents; a total of 239 accidents, in which 67 persons were killed and 223 injured.

These accidents are classified as follows:

COLLISIONS:	
Rear.....	36
Butting.....	34
Crossing.....	2
	— 72

DERAILMENTS:	
Broken rail.....	23
Loose or spread rail.....	8
Broken bridge.....	2
Defective switch.....	5
Broken frog.....	4
Broken wheel.....	12
Broken axle.....	7
Broken truck.....	1
Broken draw-bar.....	1
Broken snowplow.....	1
Misplaced switch.....	6
Rail removed for repairs.....	1
Runaway train.....	3
Open draw.....	1
Failure to give signal.....	1
Bad switching.....	2
Cattle on track.....	3
Snow and ice.....	8
Landslide.....	5
Accidental obstruction.....	3
Purposely misplaced switch.....	1
Unexplained.....	53
	— 151

OTHER ACCIDENTS:	
Cars burned while running.....	1
Boiler explosion.....	1
Broken parallel rod.....	3
Broken axle.....	5
Broken draw-bar.....	1
Miscellaneous.....	5
	— 16

Total number of accidents..... 239

The causes of collisions where given were as follows:

	Rear.	Butting.	Crossing.	Total.
Trains breaking in two.....	6	1	..	6
Misplaced switch.....	4	1	..	5
Failure to give or observe signal.....	9	3	..	12
Mistake in giving or understanding orders.....	1	2	..	2
Miscellaneous.....	1	7	2	10
Unexplained.....	16	21	2	39
	36	34	2	72

	Collisions.	Derailments.	Other.	Total.	P. c.
Defects of road.....	42	22	11	75	18
Defects of equipment.....	6	23	4	33	17
Negligence in operating.....	27	14	2	43	18
Unforeseen obstructions.....	20	..	20	40	8
Unexplained.....	30	53	3	86	39
	72	151	16	239	100

	Collisions.	Derailments.	Other.	Total.	P. c.
Passenger.....	40	66	12	118	38
Freight and other.....	100	88	4	192	62
	140	154	16	310	100

The casualties may be divided as follows:

KILLED:	Collisions.	Deraillments.	Other.	Total.	P. c.
Employés	21	20	2	43	64
Passengers	4	14	..	18	27
Others	1	5	..	6	9
Total	26	39	2	67	100

INJURED:	Employés	Passengers	Others	Total.	P. c.
Employés	52	54	1	107	48
Passengers	17	90	..	116	52
Others .....	..	..	..	..	..
Total	69	153	1	223	100

Thirty-seven accidents caused the death of one or more persons, and 62 caused injury but not death, leaving 140 (58 per cent. of the whole) which caused no personal injury worthy of record.

The comparison with January, 1887, shows:

	1888.	1887.
Rear collisions	36	32
Butting	34	17
Crossing	2	5
Deraillments	151	73
Other accidents	16	13
Total	239	140
Employés killed	43	26
Others	24	20
Employés injured	107	72
Others	118	65
Pass. trains involved	118	73

Average per day:

Accidents	7.71	4.51
Killed	2.16	1.48
Injured	7.30	4.42

Average per accident:

Killed	0.280	0.328
Injured	0.933	0.978

We have here another bad record, the month before this and the month of January last year both falling behind it in most respects. The severe snow-storm of the month just passed was accompanied by a large number of derailments, those in New England doubtless being much more numerous than the published reports indicate, but many of them were under peculiar circumstances and perhaps were not specially dangerous, being in a measure expected. The average of casualties per accident may therefore be unfair.

The worst accident of the month was that at Bradford, near Haverhill, Mass., on the 10th. The deaths from this numbered 14, but the attention given the occurrence was slight as compared with other recent accidents in which the fatality was no greater, apparently because this was generally regarded as coming much more nearly within the class of unpreventable disasters. A broken wheel or rail does not excite the criticism that a superintendent's or a conductor's blunder does, and frequently, perhaps, should not; but there are many poor wheels in use where there ought to be good ones, nevertheless. The Massachusetts Commissioners, who have investigated this accident and have made an elaborate inquiry concerning wheels, have not yet published their report.

The butting collision of passenger trains at Avoca, N. Y., was one of the most lamentable cases in the month. It may almost be classed as a direct result of the single order system of train dispatching, and gives the road a costly reminder that its action in reforming the dispatching system has been postponed too long. Passenger train 113 was several hours late and fell behind passenger train 107; the dispatcher, in making meeting points for a passenger train in the opposite direction, named 107 when he should have said 113. If the order had been in duplicate form the operator receiving the copy for 113 would have detected the error, for 107 had passed him before the order was sent to him. The coroner's jury which investigated the cause of the death of the engineer found that:

"The company required train dispatcher Sauerbier to keep an account of and report daily all cars ordered, received and on hand at date on the divisions of which he had supervision. The said divisions comprised about 176 miles of track, over which 36 trains passed daily. His duties as dispatcher required him to serve continuously 12 hours out of the 24. We recommend that the railroad company employ a person other than the dispatcher to keep and make such car reports. We further find that said dispatcher had more duties to perform at the time of making such error than should have been required."

While the verdicts of coroners' juries, as a general thing, are not founded on very exhaustive or careful inquiries, the tone of this report and the recommendations are moderate, and they deserve respectful notice. Railroads should, in such important and delicate service, at least regard the burden of proof as upon themselves; that is, instead of standing on their prerogatives and asking critics to prove that a twelve-hour day is too long, or that the amount of other work imposed upon a dispatcher is too great, should themselves be prepared to intelligently show that the hours and work are not excessive. As many of the most conservative, as well as the most progressive, officers regard eight hours as a sufficiently long day for a dispatcher, and as the real work, which is the keeping one's mind always clear and cool, is not by any means diminished on small roads or divisions in proportion to the diminution of the number of trains, it is no more than reasonable that a superintendent should carefully investigate and settle this question for his own information, regardless of accidents or coroners. It is said to be the practice in some dispatchers' offices to have an eight-hour day, but to require other clerical work, such as car records, etc., which has to be done after the nominal day is ended. This, of course, really nullifies any claim that the eight-hour system is in force.

A costly bridge accident on the Lake Shore happened, according to the reports, because a torpedo which had been placed to warn trains of the weakness of the bridge was stolen by some mischievous person, though why a torpedo alone should have been depended upon does not appear. An engine in Wisconsin ran into a passenger train, killing one man, "because the engineman was not well acquainted with the road and his cab windows were covered with frost;" and

another collision of passenger trains is reported to have been caused by a runner's unfamiliarity with the road. These are disgraceful exhibits for "first-class" roads to make. In Georgia five passenger cars were burned by a fire which started from the lamps, it is said. Forty-two head of blooded cattle were burned in a car in Colorado by a fire which it is supposed started in hay ignited by sparks from the engine. Cases of passengers killed while riding on engines, cabooses, and other places which are generally regarded as unfit for passengers, continue to be reported. Trains which are supposed to cure other trains' ills continue to multiply instead of abate obstructions, and a New Hampshire paper has the facetious headline, "The Wrecker Recklessly Wrecked."

Accidents in Canada will hereafter be omitted from our summary, as comparisons with mileage are apt to be made and to mislead; and besides this it is probable that the facts concerning the mishaps on some Canadian roads are reported less faithfully even than are those concerning the roads of this country. There was a startling collision on the Canadian Pacific Jan. 4, near White River, Ont., where, according to Winnipeg dispatches, two freights met in pitch darkness on a trestle 90 ft. high. It was in the woods and on a curve; both trains went down and five men were killed. A conductor and a telegraph operator were subsequently arrested.

There are now on trial in the Hennepin County District Court of Minnesota certain cases which are of special interest, as the result will fix to some degree the extent of the authority of the Minnesota Railroad Commission over the railroads of the state. The Commission issued an order, fixing one dollar as the maximum switching charge in Minneapolis, irrespective of the distance, or of the value of the commodity. From this the Minneapolis & St. Louis appeals. The main questions raised are: Has the railroad company the right of appeal to the courts from the orders and regulations of the Board of Railroad Commissioners and can the courts review the actions of the Commission? Further, Is the power to fix rates, as now exercised by the commission, under the authority of the Legislature, such a delegation of legislative power as to be invalid under the constitution? As to the latter point, it is claimed that the power exercised by the Commission is not a delegation of legislative authority, but simply of administrative functions, and as to the former it is claimed that, to establish the right of appeal from the orders of the Commission, would entirely defeat the object of the Legislature in creating it. The attorneys of the railroad maintain that the order is unreasonable, is against public policy, and that the charter of the company obtained from the territorial legislature in 1853, gives its directors power to fix rates. The Chicago, Milwaukee & St. Paul and the Chicago, St. Paul, Minneapolis & Omaha companies have similar cases in the United States Court. The success of the railroads in these suits would largely nullify the powers of the Commissioners.

The black-list case at New Haven which was reported last fall as having been decided in the city court of that city against the superintendents of two neighboring roads for giving to each other their lists of employés who had been discharged, has been dropped by the state's attorney. It appears that the real question of the law concerning such an act did not come up at all, as the case never reached the higher court, being dropped apparently because the evidence tended to show that there had been no consultation, either criminal or otherwise, between the accused superintendents.

A truthful black-list is not wrong in itself; yet it is a device that should be employed with great caution, whether one is afraid of labor organizations or not; for a conscientious superintendent can easily give unintentional aid to some other superintendent—who is not conscientious, or even careful—in misusing a man. The real motive in using a black list is often merely to save time and work; but this is likely to prove unjust to the employer as well as the applicant. To appoint men on their ascertained merits may sometimes involve the technical violation of a proper rule which a black list would have prevented, but substantial harm seldom ensues; while to appoint a person without an inquiry into his capabilities and reputation is poor practice, whether there be a black-list or not.

The rotary steam shovels appear to have done good work in clearing Western and Northwestern roads of snow. On the Northern Pacific the switchback over the Stampede Pass was kept clear by the aid of one rotary, a feat which was regarded as impossible in the light of past experience. Many of the Northern Pacific branches in Minnesota and Dakota had been blocked for some weeks before the rotary shovels arrived from the East, but though the snow had been blown hard and was full of sand and dirt and frozen nearly as hard as sandstone, the rotary shovels successfully cut their way through and enabled traffic to be resumed to the relief of many settlers who were short of fuel and supplies. The Oregon Railway & Navigation Co.'s line was completely blocked by snow near Pile Cañon. The rotary, however, cleared the line, and the trains followed in procession, keeping in sight of one another. Traffic was kept going in this manner, whereas it had to be suspended for many weeks three years ago. Another rotary snow shovel has been used on the Utah & Northern, where one was employed last year with results that were recorded at the time in these columns.* A rotary has also been used on the Colorado Midland, and has kept that line clear. The Chicago & Northwestern have tried a rotary which was placed at their disposal for experimental purposes. The results in clearing blockaded lines in Minnesota and Dakota were such that this company has or-

dered two shovels for next season, and the Chicago, St. Paul, Minneapolis & Omaha, and the Chicago, Milwaukee & St. Paul have each ordered one.

The hydraulic power companies have been very successful in England. Mains containing water under pressure are laid under the streets and power is supplied to consumers at certain charges. The water when used returns to the central pumping station, and is passed through the pumps and used over again. The silence, smooth working and small size of engines, etc., worked by hydraulic power render them very convenient, and the power is also largely used for presses and elevators, for which purposes the water under high pressure is very suitable.

It is stated on good authority that during the past four years about 450 elevators have been erected in London along the London Hydraulic Power Company's 25 miles of mains, in which a pressure of 700 lbs. on the sq. in. is constantly maintained for use as motive power. The Hotel Metropole, the largest in England, is fitted with 17 high pressure hydraulic elevators worked from the hydraulic pressure mains without the use of pumping machinery on the premises. These lifts are of English design and manufacture, and it is claimed are fully equal in safety, simplicity, efficiency and economy to the low pressure suspended lifts of American manufacture which are also largely used in London.

The traffic through the Severn tunnel is now so large that a block signal box will be placed in the centre of the tunnel so that trains may follow at closer intervals. The tunnel is 4½ miles long, and is at present, with the approaches, included in one block section, 8 miles long. This will now be divided into three sections. Though the tunnel passes under a tidal river, which is nearly 100 ft. deep at high water, the leakage from that source is inappreciable. Land springs, however, which gave much trouble during the construction of the tunnel, require to be pumped out at the rate of 15,000,000 gallons a day, a quantity sufficient to supply a large town.

Complaints have often been made in England that the hours of work of enginemen, firemen, conductors, etc., on English railroads are frequently excessive, and that in busy seasons the men often have to resume duty after an insufficient period of rest. An order, which has been recognized as largely in the interests of the traveling public as of the railway employees benefitted under it, has been issued by the authorities of the Great Northern Railway to the effect that the engine runners and firemen of the company at the London end of the road are not to be allowed to resume duty without an interval of nine hours' rest.

NEW PUBLICATIONS.

RECENT TEXT-BOOKS OF NATURAL PHILOSOPHY.

I. *Elementary Treatise on Analytical Mechanics*. By William G. Peck, Ph.D., L.L.D. New York and Chicago. A. S. Barnes & Co., 1887. 12mo, pp. viii, 319.

II. *Elementary Text-book of Physics*. By Professor William A. Anthony and Professor Cyrus F. Brackett. 3d Edition. New York. John Wiley & Sons, 1887. 8vo, pp. vi, 527. Price, \$4.

The elementary principles of natural philosophy are so well settled and have been so clearly stated by many writers that novelty in treatment is seldom found. But of late years some new discoveries have been made in the practical application of mechanical principles (notably in regard to the theory of friction and the discharge of liquids through orifices and pipes), and some new terms have been introduced, principally on account of the great advances made in electrical science, and modern treatises on natural philosophy might well recognize these matters. There is some difference of opinion also as to the best method of demonstrating mechanical principles, whether by simple algebraic processes or by the aid of the calculus. The calculus is used freely in the first of the two works under consideration, while algebraic demonstrations are the rule in the second.

Professor Peck's treatise is a good example of time honored methods of demonstration, ignoring the new theories of friction and hydraulics as well as the electrical terms now in common use. Some matter relating to the modulus or efficiency of mechanical devices, while not new, is seldom found in elementary works on mechanics. Beyond the omissions already noted, this book offers little ground for criticism, the definitions and methods being unusually clear and satisfactory. One or two exceptions may be mentioned. The statement that the "applied force" in a machine is called "the power" seems anomalous, since *force* and *power* are not synonymous terms; and the remarks about the seconds pendulum as a practical means of determining the standard yard are disproved by the fact that the second standard yard, made after the destruction of the first by fire, was not an exact equivalent of the latter.

The "Elementary Text-Book of Physics" does not treat of the new theories of friction and hydraulics, but it gives explanations of the terms used by modern physicists in electrical science. In fact, the general plan of the work is based on the conception of units as formulated by members of the International Electrical Congress, and those who have consulted only the old treatises on physics will find much which is novel. The method adopted in the present work seems to be a rational one, which will probably be followed by future writers. Most readers will agree that the terms used by the authors, "heat-equivalent of fusion" and "heat-equivalent of evaporation," are more philosophical than the ordinary expression, "latent heat of fusion and evaporation."

This work covers considerable ground, embracing mechanics, heat, magnetism and electricity, sound and light, sup-

* See *Railroad Gazette*, Feb. 25, 1887

plemented by several useful tables of units and other data. It is a treatise written by experts in the subjects discussed, and when used as a class-book it will require a competent instructor to develop many points which would not be rendered clear to students by the text alone.

Mr. C. P. Sandberg sends us a pamphlet containing two papers reprinted from recent issues of *Engineering*. The papers treat of Swedish railroads, technically and commercially considered. The latter, that on the commercial results, is by Wilhelm Körner, translated by Mr. Sandberg. The pamphlet is accompanied by the railroad map of Sweden, issued by Mr. Sandberg, in December, 1886. The Swedish railroad system is the growth of the last thirty years, the first construction of state roads having been under the direction of Baron Nils Ericsson, brother of our famous Capt. John Ericsson. In these papers some mention is made of the attempt to introduce narrow gauge lines in regions of light traffic. Fortunately the standard gauge was maintained generally, and economy was secured by the use of lighter rails and rolling stock. Mr. Sandberg divides the system of Sweden into three groups as follows: 2000 miles, 64-lb. rail, cost equipped \$40,000 per mile, speed, 30 miles per hour; 2,000 miles, 50 lb. rail, cost \$20,000 per mile, speed, 20 miles per hour; 2000 miles, 35-lb. rail, cost \$10,000 per mile, speed, 12 miles per hour. Some of the latter lines are 3-ft. gauge. It is worth note that all passenger cars on the state roads are heated by steam from the locomotive.

THE SCRAP HEAP.

Railroad Accidents in India.

The infrequency of railroad accidents in India is remarkable in view of the peculiar risks to which railroads in that part of the world are exposed. This, observes the *Calcutta Englishman*, is brought out clearly by last year's experiences in Bengal. Thus a signal was attacked by dacoits, and one of the men on duty was much hurt, while the others were driven from their post. Out of 14 persons convicted for trying to upset trains, 10 were small boys who put stones on the rails for the pleasure of seeing them crushed by passing trains. Nearly a thousand spikes were wrenched from their places on the permanent way and carried off by thieves; yet evidence to secure conviction could only be obtained against six persons. In India, as in most other countries, the casualties among railroad employés are greatly outnumbered by fatal accidents to the foolish people who persist in walking sleepily along the line in front of moving trains or loitering ahead of trains at railroad stations. Out of 107 persons killed on the railroads of Bengal last year, only 29 were employés, while most of the others belong to the outside category.

"Blickerne St."

It is a well-known fact that a deaf person can tell what you are talking about by the motion of your mouth. Therefore, the deaf are twice blessed when the brakeman opens the door and fiendishly shouts his message.—*Puck*.

A Crazy Engineer.

An engineer named Charles Carler, on a yard engine of the Rome, Watertown & Ogdensburg Railroad, between Rochester and Windsor Beach, four miles north, went crazy Saturday night about dark, and began a series of nuttiness that came near costing many people their lives. He knocked the fireman on the head with a hammer, rendering him senseless for the time being, then started the engine at full speed toward the city. In the meantime, the fireman regained his senses, and, jumping from the engine, notified the railroad authorities, who telegraphed east to ditch the engine. The mad engineer contented himself, however, with running his engine back and forth on the main line until the fuel gave out, and he was captured.

Engineers' Wages.

The officers of the brotherhoods of Engineers and of Firemen have on behalf of their constituents on the Chicago & Alton made an agreement with the managers of that road for a new schedule of wages. Hitherto there have been three classifications of the engineers dependent upon length of service, experience, the division of the road, the amount of switching to be done and several other conditions. The pay ranged from \$3.12 to \$4 per 100 miles, and in some instances higher wages were paid, for instance between Chicago and Bloomington, on account of the high grades. The firemen were paid 50 per cent. of an engineer's pay, though in many cases first-class firemen tended a third-class engineer. Classification is to be abolished by the new agreement. The passenger engineers are to be paid \$3.50 per 100 miles, and the freight engineers \$4 per 100 miles, with the addition of 60 cents on way freights and coal branches. The firemen are to receive 58 per cent. of the engineer's pay on passenger trains and 55 per cent. on freight trains. In return for these concessions about 20 per cent. of the engineers who were receiving more pay than allowed by the regular classification, are reduced, except in the cases of way freights and coal roads. Thus the pay of about 80 per cent. of the men will be increased. The aggregate sum heretofore paid in wages will probably be increased 5 per cent.

A Chicago paper says that a committee of engineers and firemen of the Chicago, Burlington & Quincy has been consulting with the managers of that railroad with the same purpose—to equalize the pay. The trouble on the Burlington has been an entire lack of classification, the pay being different on almost every division of the road, ranging from \$3.15 to \$4.50 per hundred. They want the same pay as the Alton men. A committee with the same objects is in Chicago in the interest of the Chicago & Atlantic engineers.

Chief P. M. Arthur is reported as saying: "We want the pay of engineers evened up. A man who is doing the same service as another man ought to receive the same pay. The railroads argue that long experience and service ought to count for something, but if a man has the experience to run an engine at all, whether he has run one or twenty years he should be paid the same wages for the same labor. The real reason why the railroads do not want to do so is not to reward long service or superior skill but to save money. This is the way it works. A man drawing first-class pay through some little mishap is discharged. A man drawing less wages is put in his place and kept there for some time at from 50 cents to \$1 less wages, though he is doing the same work and just as well as the other man. The number of men in the lower classifications is kept as large as possible. When the man who is discharged (and he would not have been discharged were it not for the classification) tries for another job, he is met everywhere by 'We are educating our men.' And I tell you it is pretty nearly impossible for an engineer out of work

to get a job. The railroads are promoting men and underpaying them. That is why engineers want to abolish classification. There are now four or five railroads running into Chicago preserving old classifications. We want to equalize the pay upon all of them."

Railroad in the Philippine Islands.

An English stock company, with a capital of \$2,500,000, has been organized to build and maintain a railroad from Manila to Dagapan on the island of Luzon, in the Philippine Islands

RAILROAD LAW—NOTES OF DECISIONS.

Powers, Liabilities and Regulations of Railroads.

In Iowa it is held that where one railroad company sells its road to another company before completion, and agrees to complete the same, the seller is a contractor, and persons working under it, by contract made subsequent to the sale, are subcontractors within the mechanics' lien law.¹

In Ohio a railroad company gave a mortgage to secure its coupon bonds, conveying all the property which it then possessed, or should thereafter acquire, and subsequently executed a lease, to which the mortgagor was not party, whereby the lessee agreed to pay the coupons at maturity, in the event the net earnings of the demised road should not be sufficient to protect the interest on the bonds. In a suit to foreclose the mortgage, the United States Circuit Court decides that the lease was not "after-acquired property," within the meaning of the mortgage.²

In Pennsylvania the Supreme Court holds that a railroad company chartered under the general railroad act of 1868 has the right to construct its road over the streets of an incorporated borough, upon making compensation to property owners, and in so doing it is not a trespasser. The manner of crossing the streets of a borough by such railroad company rests in the sound discretion of the company, and nothing less than gross abuse of that discretion will justify the interference of a court of equity, after the road is built and in operation.³

In Massachusetts the Supreme Judicial Court decides that the statute imposing a penalty on any person "knowingly without right" walking or standing on any railroad track, applies only to such acts when done without consent of the company; but they are acts which may be permitted by the railroad corporation. The right to maintain a private crossing is one which the railroad might grant, and to which it could give consent. The acts done in assertion of such right, or in virtue of such an alleged consent, are not to be treated as originally wrongful, when they have been continued over twenty years, and when the party affected thereby has acquiesced for that length of time. It does not, however, follow that, if one has acquired a private way over a railroad, it is not one which he is compelled to exercise subject to the superior right of the railroad corporation to run its trains as it may determine to be proper for the general business of its road.⁴

In Pennsylvania a resolution was adopted by the Common Council of a borough that a railroad company might cross certain streets in the borough by a grade crossing and that the company should "have the privilege of crossing the other streets of this borough according to their present location, bridging Fulton, Loder and Chemung streets." The company accepted this resolution and built wagon bridges over its track at Chemung and Loder streets, but did not build any bridge at Fulton street. After the construction of the railroad the borough filed a bill seeking to compel the company to remove the obstructions alleged to have been created in certain streets by its track, and to erect foot bridges at Chemung and Loder streets in addition to the wagon bridges, and bridges at Fulton street. The Supreme Court decides that the remedy of the borough is in an action at law for damages.⁵

In Michigan the defendant made a note payable to a railroad company 10 days after its cars should run to a stated place, if that should be in 18 months, otherwise to be null and void. The track was laid from one terminus to the point within the time, and daily construction trains ran; but it was not open to freights or passengers for some months after the time. The Supreme Court holds that the defendant is liable on the note, saying: The promise of the plaintiff was not to build and perfect its roadbed and track or its rolling stock and equipment within the 18 months to the point named, but to construct within that time its roadbed and stock, and so far perfect the same that cars could be run over the road and actually make such run within the time stated. This it did, and the subsequent completion of the road is evidence undisputed of the good faith with which it was done.⁶

Injuries to Passengers, Employes and Strangers.

In Iowa the Supreme Court rules that it is not the duty of a conductor to assist a passenger to alight from a car, nor is he bound to know that a passenger has got off before he gives the signal to start. He is simply required by law to announce the station and hold the train a sufficient length of time to permit passengers to alight.⁷

In Maine it is held that a railroad company is not liable, as a common carrier, for its failure to transport merchandise which has been checked by the owner as his personal baggage.⁸

In Indiana, after a train had started, before a passenger had time to alight, the conductor pulled or pushed her off, and she was injured. The railroad is held liable in damages.⁹

In the same state the Supreme Court rules that when a railroad makes no distinction between trains employed exclusively in transporting passengers and those employed in carrying both freight and passengers, by requiring passengers on the latter train to alight at a safe place, other than the regular depot, it is the duty of the company to stop at the regular depot a sufficient time to allow passengers to alight in safety; and where it fails to do this, and, having passed the depot, ejects a passenger entitled to be carried upon the road to such station, it is liable to answer in damages.¹⁰

In Iowa, the train upon which the plaintiff was employed was what was called a "ditching train." The train consisted of a locomotive with its tender, a caboose, and a flat car, upon which the ditching machine was placed, and upon which car it was operated by the plaintiff and other employés. It was the plaintiff's duty to assist in raising one of the buckets when it was full. At the time of the accident the front end of the car was too low to properly do its work, and the rear end of the bucket was let down. As it went down, it caused the windlass to revolve, and the crank struck the plaintiff, and broke his collar-bone. The Supreme Court rules that the injury was received "in the operation of the road" for which under the Iowa Code the road is liable.¹¹ This section of the code referred to provides that railroad corporations shall be liable to persons or employés for damages sustained by neglect of agents, mismanagement of engineers or willful wrong by them or other employés, when connected with the use and operation of a train. In another case a section-hand was directed to get on a loaded moving train by the conductor and others in charge of the train, to go to another place to help unload it, and in attempting to do so was thrown down and received

personal injuries. The Supreme Court rules that such injuries occurred in the "use and operation" of the train within the meaning of the statute.¹²

In Minnesota it is held that section and trackmen, and engineers and brakemen of trains are "fellow servants."¹³ The same ruling is made in another case by the United States Circuit Court in Texas.¹⁴

In Iowa, the plaintiff and others, section hands, were directed to get upon a loaded moving train by the conductor and others in charge. They requested those in charge of the train to stop it, but were told that, if stopped, it could not be started again. Plaintiff, in attempting to get on the moving car, was thrown down, and received severe personal injury. The Supreme Court decides that the plaintiff was not guilty of contributory negligence.¹⁵

In Pennsylvania the Supreme Court holds that a freight brakeman on a train drawn by two engines takes the risk of the increased strain put upon the couplings, and cannot recover for injuries resulting from the parting of the train. The fact that on other divisions of the same road where the grades are not so steep a pushing engine and stronger couplings are used is, in an action against the railroad company for injuries resulting from the parting of the train irrelevant. Where the proximate cause of the parting of a train is the breaking of the couplings, and the application of all the brakes but two, which are out of order, fails to stop the detached section, *non sequitur* that if the two brakes had been in good order the section would have stopped, or that the failure of the railroad company to have the brakes in good order renders it liable for injuries resulting from the collision of the detached section with the rest of the train.¹⁶ The rule of law here is that a master is not responsible to his servant for an injury the cause of which was open, permanent and visible in its character, and of which the servant assumed the risk when he entered the master's service, nor for an injury which was the result of the servant's own negligence. The same Court applies this rule in another case of an injury to a brakeman, caused by his being caught between building of the company standing near the track and a car, while coming down from the top of the car, he being familiar with the location of the building and the track, and the injury occurring in the daytime.¹⁷ The same rule is applied in an Indiana case, where a night watchman in a yard not provided with a lantern chose to go on without one and was injured.¹⁸

In New York, the plaintiff instead of looking in the direction from which a train would ordinarily come on the track which he was about to cross, looked in the opposite way, and heedlessly stepped immediately in front of an engine which he could have seen if he had looked, and which injured him. The Court of Appeals holds that he is chargeable with contributory negligence which bars his recovery. The fact that a brakeman stood at the crossing, and made no sign to the plaintiff, warning him of the approaching engine, does not excuse the plaintiff from not looking, where it does not appear that the plaintiff knew he was a brakeman, or understood that he was standing there to warn travelers, or supposed that he owed him any duty, or that the plaintiff relied upon him for security, or that the brakeman gave him any assurance that it was safe to cross. Had the brakeman in any way invited the plaintiff to cross, or given him any assurance that it was safe for him to cross, the case would be different.¹⁹

In Indiana the Supreme Court rules that it is the duty of a railroad in constructing its tracks across a highway to leave it in a safe condition. Leaving the highway in such a condition as to require the wheels of vehicles passing over the railroad track to be raised nine inches perpendicularly from the surface of the highway, in order to pass over the tops of the rails, is *prima facie* a negligent interference with the free use thereof, but is not *per se* dangerous, so as to require persons who knew of its condition to abandon travel upon it.²⁰

In another Indiana case, the plaintiff was familiar with the crossing, and the railroad track was in plain sight of travelers on the highway, for a distance of 1,000 to 1,500 ft., until a point about 10 rods from the crossing was reached, where the view was obstructed by a farmhouse and buildings and for the last 3 rods before going upon the track the railway was visible for a distance of 80 rods. The plaintiff testified that he looked, but the approaching train was so near upon the wagon that he saw no means of escape. The Supreme Court holds that the plaintiff was negligent and cannot recover damages for any injury received, and that the failure of the railroad company to perform its statutory duty in sounding the whistle cannot be held, in legal contemplation, to have been the efficient cause of the injury. Persons who could have avoided injury by exercising the opportunity to look for the approaching train will be regarded as having made the attempt to cross after having seen train approach.²¹

¹ Tempkin v. C. B. & P. R. R. Co., 35 N. W. Rep. 634.

² Moran v. Pitts, C. & St. L. R. R. Co., 32 Fed. Rep. 878.

³ South Waverly v. N. Y., Lack. & West. R. R. Co., 9 Cent. Rep. 792.

⁴ Turner v. Fitchburg R. R. Co., 5 N. Eng. Rep. 423.

⁵ South Waverly v. N. Y., Lack. & West. R. R. Co., 9 Cent. Rep. 792.

⁶ Pontiac, Oxford & Port Austin R. R. Co. v. King, 35 N. W. Rep. 705.

⁷ Baben v. Cent. Iowa Ry. Co., 35 N. W. Rep. 645.

⁸ Blumenthal v. Maine Central R. R. Co., 5 N. Eng. Rep. 355.

⁹ Louisville v. N. A. & C. Ry. Co. v. Wood, 12 West. R. p. 303.

¹⁰ White Water Valley R. R. Co. v. Butler, 12 West. R. p. 277.

¹¹ Nel-ee v. C. M. & St. P. R. Co., 35 N. W. Rep. 611.

¹² Reyburn v. Iowa Cent. Ry. Co., 35 N. W. Rep. 636.

¹³ Connally v. Miss. Eastern Ry. Co., 35 N. W. Rep. 582.

¹⁴ Eastern v. Hinton & T. C. Ry. Co., 22 Fed. R. p. 693.

¹⁵ Reyburn v. Cent. Iowa Ry. Co., 35 N. W. Rep. 606.

¹⁶ Hawk v. Penn. R. R. Co., 9 Cent. Rep. 781.

¹⁷ Kelly v. Bait. & Ohio R. R. Co., 10 Cent. Rep. 76.

¹⁸ Ind. & St. L. R. Ry. Co. v. Watson, 12 West. R. p. 285.

¹⁹ Young v. N. Y., L. E. & West. R. R. Co., 9 Cent. Rep. 870.

²⁰ Evansville & T. H. R. R. Co. v. Carver, 12 West. R. p. 203.

²¹ Ind. Bloom. & W. Ry. Co. v. Haunmock, 12 West. R. p. 207.

General Railroad News.

MEETINGS AND ANNOUNCEMENTS.

Meetings.

Meetings of the stockholders of railroad companies will be held as follows:

Atlanta & Charlotte Air Line, annual meeting, New York, March 14.

Chesapeake & Ohio, annual meeting, Richmond, Va., March 15.

Cleveland, Columbus, Cincinnati & Indianapolis, annual meeting, Cleveland, O., March 7.

Illinois Central, annual meeting, Chicago, Ill., March 14.

Missouri Pacific, annual meeting, St. Louis, Mo., March 18.

New Orleans & Northwestern, annual meeting, New Orleans, March 5.

New York, Rutland & Montreal, annual meeting, New York, March 8.

Norfolk Southern, annual meeting, Elizabeth City, N. C., March 1.

Peoria, Decatur & Evansville, annual meeting, Peoria, Ill., March 6.

St. Louis, Iron Mountain & Southern, annual meeting, St. Louis, Mo., March 13.

Utah & Nevada, annual meeting, Salt Lake City, March 3.

Wabash Western, annual meeting, St. Louis, Mo., March 13.

Wheeling & Lake Erie, special meeting, Toledo, O., March 22.

Dividends.

Dividends on the capital stocks of railroad companies have been declared as follows:

Cincinnati, Indianapolis, St. Louis & Chicago, 1½ per cent., payable March 15.

Fort Wayne & Jackson, semi-annual, 2½ per cent.

Freshfield & Jamesburg Agricultural, 4 per cent., payable March 10.

Railroad and Technical Conventions.

Meetings and conventions of railroad associations and technical societies will be held as follows:

The *General Time Convention*, spring meeting, will be held in New York, April 11.

The *National Association of General Passenger and Ticket Agents* holds its annual meeting in St. Augustine, Fla., on March 20.

The *Master Car-Builders' Association*, annual convention, Alexandria Bay, N. Y., commencing June 12.

The *American Railway Master Mechanics' Association*, next annual convention, Thousand Islands, N. Y., June 19.

The *New England Railroad Club* meets at its rooms in the Boston & Albany passenger station, Boston, on the second Wednesday of each month.

The *New York Railroad Club* meets at its rooms, 113 Liberty street, New York City, on the third Thursday of each month.

The *Western Railway Club* meets in Chicago the third Wednesday in each month.

The *Central Railway Club* meets at the Tift House, Buffalo, the fourth Wednesday of January, March, May, August and October.

The *American Society of Civil Engineers* holds meetings on the first and third Wednesday in each month at the House of the Society, 127 East Twenty-third street, New York.

The *Boston Society of Civil Engineers* holds its regular monthly meetings at its rooms in the Boston & Albany station, Boston, at 7:30 p. m. on the third Wednesday of each month.

The *Western Society of Engineers* holds its regular meetings at its hall, No. 13 Washington street, Chicago, at 7:30 p. m., on the first Tuesday of each month.

The *Engineers' Club of St. Louis* meets the first and third Wednesday of each month till June.

The *Engineers' Society of Western Pennsylvania* meets in Pittsburgh the third Tuesday of each month.

Engineers' Club of Kansas City.

A regular meeting was held Feb. 6. By direction of the Executive Committee the secretary read resolutions approving Senator Culom's bill relative to the conduct of national public works. Action was postponed. J. A. L. Waddell was elected Treasurer of the club. H. A. Leasley, A. W. Boeke and F. L. Miller were elected members. The club expressed a favorable disposition towards the formation of a national association of engineering societies, and will appoint a delegate to that end when desired. B. L. Marsteller read a paper on inspection of iron bridges and viaducts, which was discussed. The committee to consider Mr. Waddell's pamphlet on highway bridges reported in favor of the author's position, but thought indorsement of it not in accordance with custom. The Executive Committee was instructed to take action to secure discussion of the subject, and this pamphlet, at the regular meeting in April.

Engineers' Club of Philadelphia.

A regular meeting was held Feb. 4. The club passed a resolution urging upon Congress the desirability of appropriating funds sufficient to cover the expenses of placing automatic rain gauges at all principal signal stations. Mr. A. Marichal read a paper on rainfall, presenting diagrams to show mean annual rainfall in different parts of the world. A resolution to the effect that the club approve and adopt the 24 hour system of time notation was postponed until the next meeting.

Engineers' Club of St. Louis.

A regular meeting was held Feb. 15. E. H. Connor, E. C. Parker and Bathurst Smith were elected members. Mr. O. L. Pettididier read a paper on masonry and stone laying, which was discussed.

Boston Society of Civil Engineers.

A regular meeting was held Feb. 15. Joseph Coulson, Jr., C. Atherton Hicks and John H. Webster were elected members. Mr. Henry Manley was appointed a committee to arrange for the annual dinner of the society. A nominating committee was chosen to present a list of candidates for officers of the society for the ensuing year. Mr. Frederick Brooks read a paper entitled Sewage Disposal at Mifield, Mass., which was discussed. Mr. W. F. Learned gave a description of experiments made by him in the chemical treatment of sewage at Mystic Lake.

PERSONAL.

—J. W. Ferguson, Assistant Engineer in the Motive Power Department at Buffalo, of the New York, Lake Erie & Western, has tendered his resignation.

—Mr. Jas. R. Chapman, for the past seven years Superintendent of Bridges, Buildings and Water Service on the Denver & Rio Grande, has resigned.

—Mr. J. M. Johnson has been appointed Chief Engineer of the Louisville Bridge & Iron Co. at Louisville, Ky., filling the vacancy created by death of Mr. Gilman Trafton, which occurred about a year ago.

—Charles H. Cummings, General Eastern Passenger Agent of the Lehigh Valley, has tendered his resignation to take effect March 1. Mr. Cummings entered the railroad service in 1860 as a brakeman on the Fitchburg, and since 1875 has held his present position.

—William Thornburg, who has been appointed General Manager of the Valley (Ohio), entered the railway service as a brakeman on the Cleveland, Columbus, Cincinnati & Indianapolis in 1859, and has been Superintendent of the Cleveland, Lorain & Wheeling for six years past. Previous to this he was Receiver and General Superintendent of the Springfield, Jackson & Pomeroy.

—Henry G. Fleming, who has been appointed General Superintendent of the St. Louis, Arkansas & Texas, is 36 years old, and entered the railroad service in 1871, on the St. Louis, Iron Mountain & Southern. He has served as engineer on several roads, and since October, 1886, he has been superintendent of the International & Great Northern and

the Missouri, Kansas & Texas, in Texas. Previous to this he had been superintendent of the St. Louis, Iron Mountain & Southern.

—Mr. George Henry Corliss, the builder and inventor of the Corliss engine and valve-gear, died at Providence, R. I., on the 21st inst. after a short illness.

Mr. Corliss was born in Easton, Washington County, N. Y., June 2, 1817, and first gave evidence of his mechanical genius by building a bridge and inventing a machine for stitching leather, long before Howe invented the sewing machine.

In 1844 he removed to Providence, R. I., where he developed improvements in steam engines and patented his well-known valve gear in 1849. In 1853 the Corliss Steam Engine Co. was incorporated, and Mr. Corliss was made President. The works of the company, located at Providence, R. I., covers many acres of ground, and the engines of its construction are now in general use. Mr. Corliss was also the inventor of a machine for cutting the cogs of bevel wheels, an improved boiler with condensing apparatus for marine engines and of various pumping engines for water-works.

He received awards for his inventions at the exhibitions at Paris in 1867, and at Vienna in 1873, and received from the Institute of France in 1878 the Montyon prize, the highest honor for mechanical achievement. He also received the Rumford medal from the American Academy of Arts and Sciences in 1870. In 1872 he was appointed Centennial Commissioner from Rhode Island, and was one of the executive committee of seven to whom was intrusted the responsibility of all the preliminary work of the exposition.

ELECTIONS AND APPOINTMENTS.

Atlantic & Mississippi.—The directors of this Indiana company are John Higgins, John M. Boyd, Peter A. Hoffman, Richard Neptune, John C. Farber, George M. Wild and Samuel Hardung.

Atlantic & Pacific.—P. L. Crovatt has been appointed Traveling Freight and Passenger Agent, with headquarters at San Francisco, Cal.

Binghamton & Williamsport.—The directors of this consolidated company are Frank M. Ward, of Newton, N. J.; Joseph P. Noyes, John Ray Clark and James B. Weed, of Binghamton, N. Y.; Isaac O. Blight, of Towanda, Pa.; Ward Denel, of Little Meadows, Pa.; R. M. Forsman, Edgar Munson, Elias Deemer, E. R. Payne, William Gibson, J. E. Dayton, Addison Candor, and C. L. Munson, of Williamsport, Pa. Frank M. Ward, Newton, N. J., was elected president.

Bristol & Danville.—John M. Bailey is President and J. Wilder is Treasurer of this new Virginia company.

Brunswick & Western.—H. S. Haines has been appointed Vice-President and General Manager, with headquarters at Brunswick, Ga., vice A. A. Gaddis, resigned. Charles D. Owens has been appointed Traffic Manager.

Carolina, Knoxville & Western.—The officers of the Carolina division are as follows: W. L. Mauldin, Greenville, S. C., President; T. P. Branch, Augusta, Ga., and T. N. Cooper, Brevard, N. C., Vice-Presidents; A. B. Byrd, Greenville, S. C., Secretary. The officers of the Tennessee division are: Samuel McKinney, Knoxville, Tenn., Vice-President; J. W. Fletcher, Knoxville, Assistant Secretary.

Chicago & Atlantic.—W. H. Selby, General Master Mechanic on the St. Louis, Arkansas & Texas, has been appointed Superintendent of Motive Power, Machinery and Rolling Stock on the Chicago & Atlantic, with headquarters at Huntington, Ind.

Chicago & Alton.—J. C. McMullin, Vice-President, has been elected a member of the Executive Committee vice George Strant, deceased.

Chicago, Burlington & Northern.—Frank McDonald has been appointed Road Master between Prairie du Chien, Wis., and Fulton, Ill.

Chicago, Milwaukee & St. Paul.—J. N. Barr, Superintendent of the Car Department, has been appointed Superintendent of Motive Power and Machinery, and J. M. Lowry, General Master Mechanic, has been appointed Consulting Engineer of the Machinery Department. The offices of Master Mechanic and Superintendent of Car Department have been abolished.

Chicago & Northwestern.—George T. Turner has been appointed Train Dispatcher at Huron, Dak., vice Frank Eildridge, resigned.

Cincinnati, Georgetown & Portsmouth.—Ralph Peters has been elected President of this company, and H. G. Roeller has been elected Vice-President and General Manager.

Cincinnati, New Orleans & Texas Pacific.—At the annual meeting held in Philadelphia this week the following directors were elected: Frank S. Bond, Thomas T. Gaff, W. A. Goodman, Isaac P. Martin, Alex. McDonald, Otto Plock, Charles Schiff, Briggs Swift, Augustus Wessel, C. C. Harvey. The directors organized by electing the following officers: President, Chas. Schiff; Vice-President, C. C. Harvey; Secretary and Treasurer, H. H. Tatem.

Cincinnati, New Orleans & Texas Pacific.—P. Callahan has been appointed Trainmaster between Cincinnati and Somerset, and D. E. Mead between Somerset and Chattanooga.

Cincinnati & Richmond.—At the annual meeting in Cincinnati, last week, the following directors were elected: Thomas D. Messler, Wm. Thaw, J. N. McCullough, D. S. Gray, J. Dunbar, M. A. Goodman, Ralph Peters. The directors organized by electing the following officers: President, T. D. Messler, Pittsburgh, Pa.; Treasurer, John E. Davidson, Pittsburgh; Secretary, S. B. Liggett, Pittsburgh.

Cincinnati & Springfield.—At the annual meeting held in Cincinnati last week, the following directors were elected: J. D. Layng, Cornelius Vanderbilt, New York; Stevenson Burke, Amos Townsend, James Barnet, T. P. Handy, G. M. Beach, H. H. Poppleton, and G. S. Russel, Cleveland, O.

Cleveland, Lorain & Wheeling.—Frank M. Townsend, Paymaster and Purchasing Agent, has been appointed Superintendent, vice William Thornburgh, resigned. G. F. Tennant has been appointed Paymaster.

Delaware, Lackawanna & Western.—At the annual meeting held in New York this week, the old board of directors and officers were re-elected.

Denison, Bonham & New Orleans.—The following are the officers of this Texas company: President, S. B. Allen, Bonham, Tex.; Vice-President, W. B. Munson; General Manager, Edward Perry, Bonham; Treasurer, W. A. Numelee; Treasurer, H. T. Victor; Chief Engineer, S. W. Lee.

Duluth, Red Wing & Southern.—The following are the officers of this company: F. W. Hoyt, Red Wing, Minn., President; O. S. Powell, River Falls, Wis., Vice-President;

Dr. G. H. Crary, Red Wing, Secretary; T. B. Sheldon, Red Wing, Treasurer.

Duluth, St. Cloud, Mankato & Southern.—The directors of this Minnesota company are as follows: J. R. Haws, Duluth; C. Cross, Sauk Rapids; J. E. Hayward, H. C. Waite and John Cooper, St. Cloud; W. H. Greenleaf, Litchfield; John A. Willard and George T. Barr, Mankato; Charles Bennett, Eagle Lake; John Murphy, St. Clair; C. Cunningham, Alma City; H. H. Corson, New Richmond; W. H. Twiford, Geneva; R. M. Todd and W. P. Sargent, Albert Lea; D. B. Smith and G. Schleider, Austin. The directors organized by electing John Cooper, St. Cloud, Minn., President; D. K. Smith, Austin, Minn., Vice-President; H. H. Corson, Treasurer, and George T. Barr, Secretary.

Duluth, Twin Cities & Southwestern.—The incorporators of this Minnesota company are: William H. Rhawn, Benjamin Rowland, James M. Earle, John S. Brown, Philadelphia, Pa.; William H. Fisher, Phillip S. Harris, William Dawson, James Smith, St. Paul, Minn.; Thomas C. Conrad, Philadelphia.

East, St. Louis & Carondelet.—The following directors have been elected: Thomas D. Messler, S. B. Liggett, Chas. H. Seybt, J. W. Peers, A. S. Wilderman, C. D. Holies and Joseph Hill. The board organized by electing Thomas D. Messler, President, Joseph Hill Vice-President and General Manager, and S. B. Liggett Secretary and Treasurer.

Grand Trunk.—Philip J. Slemmons has been appointed Freight Agent at Buffalo in place of S. S. McCrea, who has resigned to become a Custom House broker.

Lake Erie & Western.—M. P. Denniston has been appointed Trainmaster of the Indianapolis & Michigan City division.

Mann's Boudoir Car Company.—The following officers have been elected: Thomas C. Purdy, President and General Manager; Edward Mahony, Vice-President; Charles G. Hedge, Secretary and Treasurer.

Minneapolis & St. Louis.—M. E. Turner has been appointed General Northwestern Freight Agent, with headquarters at St. Paul, Minn., vice E. D. Parker, resigned.

Missouri Pacific.—The office of "Superintendent of Car Service" has been created, and C. W. Hequembourg has been appointed to fill the position.

Mobile & Hattiesburg.—The following directors have been elected: F. A. Lulinz, R. Dane, O. F. Cawthon, W. M. Carney, H. Austill, Jas. K. Glennon and Adam Glass, of Mobile, Ala.; W. L. Nugent, of Jackson, Miss.; John Kemper, of Enterprise, Miss.; J. P. Carter, of Hattiesburg, Miss. The directors organized by electing O. F. Cawthon, Mobile, President, and H. Austill, Mobile, Vice-President and General Manager.

Mobile, Hattiesburg & Jackson.—S. B. Brown, Mobile, Ala., is Chief Engineer of this road.

Montgomery Southern.—Bradford Dunham has been appointed Vice-President and General Manager of this Georgia Company.

New York, Lake Erie & Western.—George W. West has been appointed Master Mechanic at Jersey City, N. J.

New York, Pennsylvania & Ohio.—W. Lavery has been appointed Master Mechanic of the eastern division, with headquarters at McAdoo, Pa., vice G. W. West, transferred. James S. McCool has been appointed master mechanic of the western division, with headquarters at Galion, O., vice W. Lavery, transferred.

Northern Pacific Express.—H. H. Browning has been appointed General Superintendent, to take effect March 1, vice W. J. Footner, resigned.

Ohio & Mississippi.—A. J. Lytle has been appointed General Western Passenger Agent with headquarters at St. Louis, Mo., to take effect March 1.

Pasadena & Los Angeles.—The first board of directors of this California company are: George McHarry, H. N. Rust, W. Anz. Ray, J. Banbury, A. J. Painter, I. Townsend and J. Mills.

Pittsburgh, Shenango & Lake Erie.—The following are the directors of this reorganized company: Henry Raule, Mountoursville, Pa.; Henry Walker, Meadville, Pa.; J. T. Blair, Greenville, Pa.; E. S. Templeton, Thoms H. Wells, Youngstown, Ohio; Joseph Berry, Detroit, Mich.; M. S. Frost, New York. The following officers have been elected: M. S. Frost, President, 71 Broadway, New York; James T. Blair, General Manager, Greenville, Pa.; E. S. Templeton, Secretary; I. D. Stinson, Treasurer; P. E. McCray, Auditor.

Quincy Belt Line & Terminal.—This Illinois company has been organized by electing the following officers: John Dick, President; Thos. Austin, Vice-President; John M. Savin, Secretary; Wm. Steinwedell, Treasurer; Hon. A. W. Wells, Attorney.

St. Louis, Arkansas & Texas.—Henry G. Fleming has been appointed General Superintendent of this road.

St. Paul, Minneapolis & Manitoba.—C. B. Ticknor has been appointed Traveling Passenger Agent, with headquarters at Oshkosh, Wis., vice W. Abel, resigned.

South Atlantic & Northwestern.—At the annual meeting of this company, held at Southport, N. C. (formerly Smithville), the following directors were elected: James G. Dane, of Chicago; L. F. Hepburn, of New York; W. G. Curtis, of Southport, N. C.; R. J. G. Wood, of New York; W. R. Wilson, of New Jersey, and W. H. Phillips, of New York. The directors elected Walder H. Phillips President, James F. Dane Vice-President and Treasurer, and John W. Coley Secretary.

Summit Branch.—At the annual meeting held in Philadelphia last week the old board of directors were re-elected as follows: G. B. Roberts, I. J. Wistar, A. J. Cassatt, Edmund Smith, Wistar Morris, N. P. Shortridge, J. N. Durbarry, J. P. Green, W. J. Howard, W. H. West and G. F. Swift.

Valley & Brazos Valley.—The following are the officers of this road: President, William Cameron, Waco, Tex.; Vice-Presidents, Edward Rotan, Samuel Sanger; Secretary, John H. Finks; Treasurer, J. W. Maun.

Western Pennsylvania.—At the annual meeting held in Philadelphia last week, John P. Green, Wistar Morris, George B. Morris and Edmund Smith, Philadelphia, Pa., were elected directors, and J. N. DuBarry, Philadelphia, Pa., was elected President.

Yankton & Southwestern.—The incorporators of this Nebraska company are: Henry B. Lowe, William B. Royce, N. F. O'Neill, M. D. Stevens and C. C. Luckey, of Orange County, New York.

OLD AND NEW ROADS.

Alabama, Florida & Atlantic.—The grading on this road has been finished between Clay Spring and Eustis, Orange County, Fla. The road is projected to extend from Montgomery, Ala., via Gainesville, Fla., to Biscayne Bay, about 500 miles.

Anniston & Cincinnati.—This road has been put in operation as far as Duke's Ala., on the East and West of Alabama. The road is projected to extend from Anniston, Ala., through Alexandria and Gadsden to Atalla, about 36 miles. A. L. Tyler, Anniston, Ala., is President.

Apopka & Atlantic.—This road was sold at mortgage sale last week to G. O. Garrett, of Orlando, Fla. The road extends from Woodbridge to Forest City, Orange County, Fla.

Allegheny & Kinzua.—J. W. Watson and D. Shine, Olean, N. Y., have received the contract for this standard gauge road which is to extend from near Bradford, Pa., 22 miles, to Redhouse, in Cattaraugus County, N. Y.

Atchison, Topeka & Santa Fe.—Surveyors are said to be at work locating a new line which will extend from Carrollton, Mo., through Miami and Marshall to Sedalia.

Athens & Jefferson.—The preliminary survey for this road from Athens, Ga., northeast to Jefferson, Jackson County, 18 miles, has been finished and the greater part of the right of way has been secured.

Atlantic, Atlanta & Great Western.—Work will probably be commenced on this road during the spring. It is projected to extend from Savannah, Ga., via Springfield, Sylvan, Waynesborough, Sparta and Eatontown, to Atlanta, Ga., about 250 miles. Col. George T. Fry is President of the company.

Atlantic & Mississippi.—Articles of incorporation have been filed in Indiana by this company for the purpose of building a road, with a capital stock of \$200,000, in a southwesterly direction through the counties of Adams, Wells, Huntington, Grant, Howard, Tipton, Clinton, Boone, Montgomery, Fountain and Vermillion, to the Illinois state line, a distance of 150 miles.

Augusta, Gibson & Sandersville.—The stockholders have voted to accept the new charter which permits the company to extend the road from Sandersville, Ga., 80 miles from Augusta, via Hawkinsville and Albany, Ga., to St. Andrew's Bay, Fla.

Blackville, Alston & Newberry.—The contract for grading this road from Sally's to the Kaolin mine, recently mentioned in these columns, has been let to J. L. Irving.

Boston & Albany.—The officials of the city of Cambridge have asked the legislature to prohibit or greatly restrict the running of trains on the Grand Junction branch of this road, which leads from the main line three miles west of Boston around through Cambridge and Somerville to the elevators and ocean shipping wharves at East Boston. This branch was chartered 34 years ago, and crosses several streets in Cambridge at grade. These streets have become important, and the crossings are now a great inconvenience. The city asks that the road be discontinued, or that the running of trains (which are freight only) be restricted substantially to the night time. In case of discontinuance, it is claimed that the Boston & Albany could, by building a bridge over the Charles River and laying 2000 ft. of track, connect with the Watertown branch of the Fitchburg, and reach the East Boston line over the Fitchburg's track. The Fitchburg is, however, a competing line, and naturally has no interest in aiding the East Boston branch.

Buena Vista & Ellaville.—The preliminary surveys for this branch of the Central of Georgia, which is to extend from Buena Vista, Ga., to Columbus, a distance of 38 miles, have been nearly all completed, and contracts will be let as soon as the location is further advanced. The road passes through a rough country, and the construction work will be heavy. M. S. Belknap, Savannah, Ga., is General Manager.

Buffalo & Geneva.—The right of way for this road is now being purchased. The road is understood to be a Lehigh Valley project, and extends from Geneva, N. Y., to Buffalo, about 120 miles, its eastern connection being with the Geneva, Ithaca & Sayre, and by that road to the main line of the Lehigh Valley. E. M. Leuffer is Chief Engineer.

Burlington & Missouri River.—The Broken Bow extension has been completed to the new town of Alliance, Neb., 340 miles from Lincoln. This extension is in operation as far as Whitman, Neb.

Canadian Pacific.—Engineers have been sent to locate a line from a point at or near Claremont on the Ontario Division, northwest to Sudbury on the main line. The recent acquisition of the Northern & Northwestern system by the Grand Trunk has given them control of the rail connection between Western Ontario and the main line of the Canadian Pacific. During the past two or three years the Canadian Pacific has used this line to a considerable extent for passenger and freight business between Manitoba and the Northwest and Ontario, but now it becomes necessary for this company to construct a line of its own. The distance via Sudbury and the proposed line will be about 70 miles shorter than the present line via North Bay from the Canadian Northwest by the Canadian Pacific main line, and from the Northwestern United States via Sault Ste. Marie.

Cape Girardeau Southwestern.—The survey for the extension of this road from Wappapello, Stoddard County, Mo., its present terminus, 52 miles from Cape Girardeau, to a connection with the Current River extension of the Kansas City, Fort Scott & Gulf at Wellsville, is in progress, and contracts will be let when the location has been completed. Louis Houck, Cape Girardeau, Mo., is President.

Carolina, Knoxville & Western.—The contract for the South Carolina division will be let soon, and it is expected that grading on this division will commence during March, and that about 25 miles from Greenville toward the North Carolina division will be completed by June. The company also wants locomotives, passenger, box and gondola cars, and 60-lb. steel rails.

Carson & Colorado.—It is stated that this road will be extended from Keeler, Cal., south to Mojave, on the Southern Pacific, about 150 miles. The road extends from Mound House, Nev., to Keeler, Cal., 290 miles. H. M. Yerrington, Carson, Nev., is president.

Chartiers.—The contract for grading the McDonald's & Bridgeville extension of this road was divided into six sections and let as follows: Two sections each to Miller & McCann, Steubenville, O., and Timothy Scanlan, Pittsburgh, Pa., and one each to J. R. De Witt, Jr., Washington, Pa., and Van Dyke & Wilson. The rest of the road will probably be let soon.

Cherokee & Dakota.—The stockholders have authorized the issue of bonds to the amount of \$3,000,000 to be

used in paying off the floating indebtedness of the road. It is a branch of the Illinois Central and extends northwest from Cherokee, Iowa, to Sioux Falls, Dak., about 80 miles, and from Cherokee southwest to Onawa, Iowa, 61 miles.

Chicago, Burlington & Quincy.—The trainmen are being examined for color blindness by committees consisting of a train dispatcher, conductor and engineer.

Chicago, Kansas & Southwestern.—The right of way is being secured for this road, which is to extend from Parnell, Mo., southwest through Rulo, Neb., Hiawatha and Emporia, Kan., to Arkansas City, near the border of the Indian Territory, a distance of about 300 miles. A. J. Schilling, Hiawatha, Kan., is President.

Chicago, Milwaukee & St. Paul.—It is said that this road will extend its line from Tomahawk Lake northwest to Ashland, Wis., on Lake Superior and that it will build a line from Warren, Ill., south to Lanark or Savanna.

Chicago, Rock Island & Pacific.—The report that this company intends to build 1,200 miles of new road this year is denied by President Cable, who says that they will complete about 300 miles from the present western terminus of the western division (the Chicago, Kansas & Nebraska) near the Colorado state line, to Colorado Springs. It is stated that the company has made arrangements with the Denver & Rio Grande to use the latter's tracks from Colorado Springs to Pueblo and from Colorado Springs to Denver.

Chicago, St. Paul & Kansas City.—The road is completed between Portage Curve and Aiken, Ill., and the company's trains now run over its own tracks between St. Paul and Chicago.

Choctaw Coal & Railway.—The bill to authorize the construction of this road through the Indian Territory, has been signed by the President.

Cincinnati & Richmond.—This branch of the Pittsburgh, Cincinnati & St. Louis, extending from Red Bank, Hamilton County, O., to Hamilton, has been completed, but it is not expected that it will be put in operation before June, as part of the line has yet to be ballasted.

Cincinnati, Wabash & Michigan.—This company has made a contract with the American Express Company by which that company will take charge of the express business over its line, succeeding the United States Express Company.

Cincinnati, Wheeling & New York.—Judge J. W. Campbell has been appointed Receiver of this road. The Ohio Commissioner recently inspected the road between Cumberland, O., and Morgan Junction, about 19 miles, and ordered the speed of trains reduced to 8 miles an hour, and latterly the road has only been operated to Hartford, 8 miles from Morgan Junction.

Comptonsville Short Line.—It is reported that this company may extend its road to Ellicott City, Howard County, Md., on the Baltimore & Ohio.

Corinth, Birmingham & Bolivar.—This company has been incorporated in Mississippi.

Covington & Macon.—The contract to grade this road through Madison, Ga., has been let to Martin & Co.

Cumberland Valley.—This road will probably be extended from Martinsburg, W. Va., its present terminus to Winchester. T. B. Kennedy, Chambersburg, Pa., is President.

Delaware, Lackawanna & Western.—The company propose building two shops at East Buffalo, and will remodel their shop on River street in Buffalo.

Denison, Bonham & New Orleans.—The survey has been completed from Denison, Tex., southeast, to a point 18 miles from Bonham, and that part of the road between Denison and Bonham is ready for the rails. Bonds have been authorized to the amount of \$15,000 per mile.

Denison & Sherman.—The preliminary survey for this line has been completed, and it is expected that the final location will be made during March. N. B. Munson, Sherman, Tex., is President.

Duluth, St. Cloud, Mankato & Southern.—It is said that the survey for this road will be commenced at once. The road is projected to extend from Duluth, through St. Cloud, Litchfield, Mankato, Alma City, New Richland and Geneva, Minn., through Freeborn and Albert Lea to the southern border of the state. The officers are given in another column.

Duluth, Twin Cities & Southwestern.—Incorporated in Minnesota to build a road from St. Paul and Minneapolis to a point near the southern boundary of Faribault County (the Iowa line). It is understood that this is the Omaha extension of the St. Paul & Duluth, and there is a provision in the charter permitting the new company to purchase the present St. Paul & Duluth. The capital stock is placed at \$15,000,000.

East Alabama.—The survey has been commenced for the extension of this road from Roanoke, Ala., northwest to Anniston.

East Louisiana.—This road, which was recently completed to Covington, La., 60 miles northeast of New Orleans, will probably be extended from there across St. Tammany, Washington and Tangipahoa counties to a connection with the Illinois Central. John Poiterent, New Orleans, La., is president.

East Tennessee, Virginia & Georgia.—Col. Cary A. Wilson, Chief Engineer of the Mobile & Birmingham, which has just been completed to Marion Junction, Ala., has been instructed to commence the survey for a road to extend from Montgomery northwest to Maplesville, on the Alabama Division of the East Tennessee, Virginia & Georgia, between Selma and Calera, about 40 miles, and it is said that construction work will begin as soon as the survey has been completed.

Eel River & Eureka.—This road, extending from Eureka, Humboldt County, Cal., southward through the Eel River Valley for a distance of 45 miles, has been purchased by the Southern Pacific, which will probably extend it to a connection with its main line.

El Paso & White Oaks.—It is reported that this road, which is projected to extend from El Paso, Tex., to a point in the Texas Panhandle, has been bought by St. Louis people.

Forest City & Watertown.—The grading on this road has been completed from Forest City, Potter County, Dak., in a northeasterly direction through Walworth and Edmunds counties for about 100 miles. Tracklaying will commence on this part of the road as soon as possible, and contracts for grading other parts of the line will be let very soon. R. W. Springer is President.

A road is projected to extend from Gainesville, Fla., west to Lake Newman, connecting by steamer with Windsor. Maj. N. R. Gruelle, Ocala, Fla., is the engineer.

Fort Smith, Paris & Dardanelle.—It is said that this company has secured the necessary funds to complete its road and that the location will be made as soon as the right of way has been secured. Dardanelle, Ark., will guarantee the right of way to Big Shoal Gap, a distance of about 20 miles. The company was incorporated last April to build a road from Fort Smith, Ark., to Dardanelle, about 80 miles. Col. C. R. Jones, of Fort Smith, Ark., is one of the directors.

Fort Worth Western.—The contract for constructing this road from Fort Worth, Tex., northwest to Springtown, in Parker County, a distance of about 30 miles, has been let, and it is expected that grading will be commenced during March.

Fremont, Elkhorn & Missouri Valley.—This company has filed amended articles of incorporation in Nebraska. The capital stock is fixed at \$30,000,000, and provisions are made for building branch lines in Nebraska, Wyoming and Dakota. The line from Omaha northwest to Douglas and the Black Hills is made the main line. The headquarters of the road will be changed to Omaha, Neb.

Gainesville & Southwestern.—A company will be organized under this name to build a road from Gainesville, Tex., to a point on the Rio Grande River, 35 miles southwest of Gainesville. The part from Gainesville to Decatur, on the line of the Fort Worth & Denver City, has been surveyed and will be built first. It is believed that when ready for the rails it will be offered to one of the three companies it connects with.

Georgia Southern & Florida.—Track has been laid on this road for 15 miles from Macon, Ga., and the line is graded 100 miles further.

Great Northwest Central.—The location of this road for the first 100 miles has been completed. Fifty-six miles are under contract and 26 miles have been graded, and this part of the line is expected to be finished during the summer. It is expected that 100 miles more will be graded this year and contracts will be let during the early part of summer. The road as projected extends from Brandon, Man., through Rapid City, to Battleford, Saskatchewan, about 450 miles, and has a grant of 2,880,000 acres of land from the Canadian government. Hon. Senator Clemow, Ottawa, is President.

Houston, Central Arkansas & Northern.—The survey for this road between Pine Bluff, Ark., and Alexandria, La., has been made, and a preliminary location is now being made to Houston, Tex., about 330 miles from Pine Bluff. Major James Converse, San Antonio, Tex., is Chief Engineer.

Illinois Valley & Northern.—The grading on this road has been nearly completed, and the tracklaying is in progress from both ends of the line, and about 40 miles have been laid. The road is to extend from Walnut, Bureau County, on the Mendota, Clinton & Fulton branch of the Chicago, Burlington & Quincy to Streator, on the Aurora & Streator branch, a distance of about 57 miles, and it is expected it will be completed by May. E. P. Reynolds, La Salle, Ill., has a contract for part of the road.

International & Great Northern.—A passenger depot will be built at Austin, Tex., which will cost \$35,000, and will be 40 x 175 ft. and 40 ft. high.

Kanawha & Ohio.—The greater part of the right of way for an extension from Charleston, W. Va., the present terminus, to the coal fields in Fayette County, has been secured, and work, it is said, will commence soon. H. D. Whitcombe, Charleston, W. Va., is Chief Engineer.

Kansas City, Memphis & Birmingham.—The branch of this road from Amory to Aberdeen, Miss., about 14 miles, lately reported as completed, has been opened for traffic.

Kansas City, Arkansas & New Orleans.—The survey for this road, which is to extend from Beebe, Ark., to Monroe, La., a distance of 200 miles, is now being made by Chief Engineer G. W. Williams.

Kentucky.—The Kentucky Legislature has passed bills incorporating the Pittsburgh, Kentucky & Nashville and the Paducah & Jackson roads.

Kentucky Midland.—A preliminary survey has been made for this road between Frankfort, Ky., and Owingsville, a distance of about 68 miles. It is thought that the final location will materially reduce this distance.

Kings County Elevated.—Willard T. Sears has brought suit against the directors to restrain them from increasing the stock and bonded indebtedness. The plaintiff asserts that he was induced to surrender 75 per cent. of his stock to trustees by misrepresentations, and that contracts with a syndicate to build and equip the road have been made at exorbitant rates.

Knoxville Southern.—The contract for grading 25 miles of this road has been let to the Georgia Construction Co., of Augusta, Ga. The road is projected to extend from Knoxville, Tenn., to Atlanta, Ga., and makes connections with the Louisville & Nashville and Powell's Valley roads.

Lincoln, Red Oak & Des Moines.—The engineers are locating the line of this road between Lincoln, Neb., and the Missouri River.

Long Beach, Whittier & Los Angeles.—It is said that this road, now constructing a line from Los Angeles, Cal., to Whittier, may be extended east to San Dimas and north from Whittier to Shorb. The road will be completed at Whittier next week.

Los Angeles, Carleton & Eastern.—This company, reported last week, will build a narrow gauge road from Carleton through Whittier to Los Angeles.

Louisville & Nashville.—The town of Mount Vernon, Ill., on the line of this road, suffered from a terrible cyclone on Sunday, Feb. 19, by which 35 people were killed and a large number injured. One employé of the road was killed and five injured. The passenger and freight depots and round-house were considerably damaged, and the freight and master mechanic's offices were wrecked. Two cabooses were blown from the track and turned bottom up.

Louisville & Nashville.—At the special meeting of stockholders of this company held in Louisville this week, the issue of \$5,000,000 of new stock, part of which will be issued in payment of the scrip dividend recommended by the directors, was formally authorized.

Louisville Southern.—The grading on this road is finished from Louisville to Harrodsburg Junction, a distance of 80 miles, and is ready for the track. The extension to Danville, 9 miles from Harrodsburg, is all surveyed, and contracts will be let within the next 60 days for the grading

and tracklaying. The extension from Lawrenceburg to Lexington, Ky., about 25 miles, is all surveyed, and contracts will be let for grading and tracklaying soon. In the spring surveys will be made for the extension from Lawrenceburg through Versailles, to Three Forks, Ky., a distance of about 70 miles.

Tracklaying on the Louisville end is completed for 17 miles, and is being continued at the rate of $\frac{1}{2}$ mile per day. From Harrodsburg the track is laid for 13 miles. A 60-lb. rail is used. They are using at this end the champion steam tracklayer, built by Abner Price, of Chicago, which is giving good results, laying about 2 miles per day. The contractors expect to finish this work by April 1, and the railroad company will have trains running May 1. The contractors for grading and tracklaying are Mason, Gooch & Hage.

The equipment is contracted as follows: Baldwin Locomotive Works are building 10 engines, of which 3 are delivered, and all to be delivered by May 1. Jackson & Sharp are building the passenger and baggage cars—10 passenger and 3 baggage—which will be of modern design, containing all improvements. The Indianapolis Car Co. is building 300 freight cars.

The railroad company has purchased ground in Louisville for a terminal station at Twelfth and Canal streets, and has also purchased 16 acres for the company's shops. Plans and specifications are being drawn, and contracts for depots, shops, etc., will be let as soon as ready. Until these are furnished, the company has arranged with the Chesapeake & Ohio to use its depot.

A bridge will be built across the Kentucky.

Manitoba & Northwestern.—This road is being constructed from Langenburg—to which point it is in operation, 180 miles, from Portage La Prairie—to Prince Albert, N.W.T., a distance of about 250 miles. The road is projected to extend from Portage La Prairie, Man., to Prince Albert, about 430 miles, with branches from Toddburn to Shellmouth, about 26 miles, and has a subsidy of 6,400 acres per mile from the Dominion Government. George W. Webster is Chief Engineer. The general offices are at Portage La Prairie, Man.

Marshall, Paris & Northwestern.—Tracklaying on this road has been completed for a distance of 18 miles northwest of Marshall, Tex., and from that point the location to Paris, about 95 miles, has been completed, and work will commence on that part soon. The road was purchased some time ago by the St. Louis & San Francisco. John Martin, Paris, Tex., is President.

Massena Springs & Fort Covington.—Tracklaying has been completed for 10 miles, and it is expected that the entire road will be opened for business during the spring. It is a branch of the Grand Trunk, extending from Fort Covington, N.Y., on the Montreal & Champlain Junction division, a distance of 23 miles, to a connection with the Rcm, Watertown & Ogdensburg.

Maysville & Big Sandy.—A mortgage for \$7,500,000 has been made by this company in favor of the Union Trust Co., of New York, to secure the payment of bonds issued by it for this road. The meeting of the stockholders to ratify the mortgage will be held in Maysville, Ky., Feb. 29, after which construction work will be commenced. The road extends from Ashland, Ky., northwest through Maysville to Cincinnati, 135 miles, and will connect the latter city with the Chesapeake & Ohio.

Memphis & Charleston.—Work is expected to begin in the Spring on an extension of this road from Stevenson, Ala., to Chattanooga, Tenn., about 38 miles. The company now uses the track of the Nashville, Chattanooga & St. Louis between these points at a yearly rental of \$60,000, under a contract which will expire next fall.

Merrill, Warsaw & Abbotford.—A bill has been passed in the Wisconsin Legislature authorizing the Merrill & Abbotford to change its name as above. The road is projected to extend from Abbotford to Warsaw and Merrill, Wis.

Mexican Central.—Track on the Guadalajara Branch has been laid for 98 miles, and the graders are 18 miles ahead.

Missouri Pacific.—A committee has been appointed to endeavor to have this company extend its road through St. Genevieve County, Mo., to Ste. Genevieve.

Mobile & Birmingham.—The gap of five miles which remained to complete this road between Selma and Mobile was finished last week. The road extends from Mobile, Ala., north to Marion Junction, on the East Tennessee, Virginia & Georgia, 149 miles, and is in operation as far as Bigbee Junction, 61 miles. A new connection is thus opened from Mobile to the North.

Mobile & Ohio.—It is stated that the machine shops of the St. Louis division of this road will be removed from East St. Louis to Murphysboro.

Montgomery, Hayneville & Camden.—C. P. Rogers, of Letohatchie, Ala., has finished his survey of this road from Hayneville to Camden.

New Roads.—It is said that Messrs. Tardy & Vandegrift will build a road from Red Springs, Robeson County, N.C., to Persepolis, a distance of about 10 miles, and will open up saw mills along the road.

S. G. Culpepper, of Boston, Thomas County, Ga., will build a narrow gauge logging railroad.

J. E. Keller, Lexington, Ky., is interested in a project to build a belt road, 14 miles in length, at Lexington.

A road is projected to extend from Staunton, Va., through Augusta, via Weyer's Cave, Brown's Gap, Standardville, in Green County, Madison Court-house and Warrenton to Washington, by J. C. Marquis, A. C. Braxton and others. It is said that a charter will soon be applied for.

New York & Massachusetts.—Security holders have begun a suit to annul the charter of this road, claiming that \$82,000 was wrongfully expended at the time of the reorganization of the old Poughkeepsie, Hartford & Boston, and that the officers acted in bad faith in other ways.

New York & New England.—The directors have offered to buy the Rockville Railroad extending from Rockville, Conn., to the main line of the New York & New England at Vernon, 4.8 miles, which is leased to and operated by the last named road, for 50 per cent. on the common stock and par on the preferred stock, to be paid in 5 per cent. 30 year bonds.

Old Colony.—The stockholders of the Old Colony Steamboat Company have voted to increase its capital stock to \$1,200,000 by issuing 3,000 new shares, which will be offered pro rata to the present stockholders.

Orange Belt.—The road has been completed from Macon to Tarpon Springs on the Gulf of Mexico, and there is nearly 110 miles in operation. The entire line from Monroe, the northeastern terminus of the road, about 3 miles north of Sanford, to Petersburg, 32 miles from Tarpon Springs, on Tampa Bay, is expected to be completed in three months.

Oregonian.—The Oregon Railroad Commission has lately made an inspection of this road from Woodburn to Coburg, a distance of about 80 miles, and finds that "the ties throughout have become very rotten and in many places are broken, and the Commissioners feel constrained to somewhat urgently recommend that repairs be executed with all possible despatch."

Oceola & Lake Jessup.—This company will build a road from a point on the Orlando & Winter Park, 13 miles, to Lake Jessup, Fla. John R. Mizel, Winter Park, Fla., is interested.

Oxford & Clarksville.—The contract to build the extension from Oxford, to Durham, 32 miles, recently reported in these columns, has been let to L. Wright & Co. and G. & C. Wright, by the New York & Southern Construction Co. of Richmond, Va. They will commence work immediately and expect to finish by August.

This road has been put in operation to Oxford, Granville County, N.C.

Pasadena & Los Angeles.—Articles of incorporation have been filed in California for a company of this name, with a capital stock of \$500,000.

Pittsburgh, Shenango & Lake Erie.—A construction company will be formed by this company to extend its road, recently reorganized, from Greenville, Pa., to Erie. The contract has not yet been let.

Plattsburg & Kansas City.—A narrow gauge road is proposed to extend from Plattsburg, Mo., to Randolph, and then over the Chicago, Milwaukee & St. Paul bridge and tracks to Kansas City, a distance of about 30 miles.

Portsmouth & Southwestern.—This company has been incorporated in Virginia to build a road from Portsmouth, Va., on the Seaboard & Roanoke to Surry, in the southeastern part of the state.

Powell Valley.—McDonald & Shea have completed 20 miles of the grading on their contract. The road is being constructed by The American Association, Limited, of London, Eng., of which Alexander A. Arthur is Manager at Knoxville, Tenn., and extends from Knoxville, Tenn., to Cumberland Gap, a distance of 65 miles. The contracts for 35 miles more will be let in about 30 days. Maj. J. W. Wilson, Knoxville, Tenn., is Chief Engineer.

Pueblo, Gunnison & Pacific.—Business men of Pueblo, Col., are organizing a road under this name to extend from Pueblo west through the Masco and Cochetopa passes via the Saguache and Gunnison valleys.

Quincy Belt Line & Terminal.—This company has filed articles of incorporation in Illinois to build a belt line around the city of Quincy, Ill. The capital stock is \$500,000.

Red River Valley.—Premier Greenway states that he has received an offer to build that part of this road between West Lynne and Portage La Prairie, and that those who make the offer will give a \$100,000 check as a guarantee of good faith.

Roanoke & Southern.—One hundred thousand dollars aid has been voted this company at Winston, N.C. The survey from Roanoke to Salem, N.C., is almost completed and bids have been asked for constructing the first division of the road from Winston to Martinsville, Va.

St. Johns River.—It is stated that this road will be extended from Jacksonville, Fla., to Palatka.

St. Louis, Arkansas & Texas.—The extension of this road, which leaves the Sherman section at Commerce, Tex., and extends southwest toward Fort Worth, has been completed from Plano beyond Grapevine Springs.

St. Louis & Central Illinois.—It is said that a contract has been made to extend this road from Newbern, Ill., on the main line, southerly to Alton, and that work will commence in about a month.

St. Paul, Minneapolis & Manitoba.—The contract for building the line of this road from Hinkley, Minn., its present junction with the St. Paul & Duluth, northeast to West Superior, about 75 miles, has been let to Foley Bros. of St. Cloud, Minn., for it is said, \$750,000. The road will be built by the Eastern Minnesota, of which Henry D. Minot, St. Paul, is President.

A contract for 5,500 tons of steel rails has been made. The greater part of them will be used in Montana, where about 500 miles of branches and extensions are projected.

San Diego & Elsinore.—The grading of this road, which was recently incorporated, is nearly completed between Pomona, on the Southern Pacific main line, and South River side. The road is projected to extend from Pomona south, through Elsinore, to San Diego.

Savannah & Fort Valley.—This company has been incorporated in Georgia, with a capital stock of \$1,000,000, by H. B. Hollins and others.

Seattle, Lake Shore & Eastern.—Hunt & Patton, who have the contract for constructing 40 miles of this road, have finished grading the first 10 miles, which includes the hardest part of the work.

Shingle Springs & Placerville.—The grading on this road has all been completed and the tracklaying will be finished in a few days. The road is a branch of the Sacramento & Placerville and extends from Shingle Springs, Cal., the terminus of that road, to Placerville.

South Atlantic & Northwestern.—The town of Southport, N.C., has granted the right of way to this company. The counties along the line of the road have voted \$600,000 to the enterprise, and additional county subscriptions, amounting to about \$600,000 are also expected. The road is projected to extend from Southport on the North Carolina Coast, near Cape Fear, to Bristol, Tenn. The officers are given in another column.

South Florida.—The extension of this road from Tampa to Porto Tampa has been completed and put in operation. A dock has been built extending 4,000 ft. into the bay, to deep water, permitting the large steamers to transfer their car goes directly to the cars.

Southern Pacific.—It is reported that a survey will soon be made for a new line to extend from Florence, Fremont County, Cal., to El Monte, Los Angeles County.

The road to Long Beach from Wilmington has been completed. The Los Angeles, Wilmington & San Pedro branch will probably be extended to Lighthouse Point. The grading and tracklaying on the road, between Fresno and Paso, has been completed for several miles south and east of Fresno, and the grading forces have passed King's River. This branch will also be extended from Oakdale to Fresno. On the line being built south from Tracy, the track has been laid for 70 miles. This line will be extended through Huron to a connection with the main line at Sumner. The survey for a road from Ansheim through McPherson, to Tustin and Santa Ana has been commenced. The greater part of the right of way has been obtained.

The road will be double tracked between Oakland and Martinez, a distance of 36 miles, and work will be commenced in a few weeks.

Southern & Western Air Line.—S. D. Dunavant, Knoxville, Tenn., has received the contract for this road, between Shelby and Cranberry, S.C.

Staten Island Rapid Transit.—A large depot will soon be erected at St. George, S.I., and improvements will be made at the Battery ferry house, New York, which will give an entrance direct to the elevated railroad station. The ferry slips will also have to be widened to accommodate the two new steel ferry boats which are expected to make the trip between New York and Staten Island in 18 minutes.

Texas, Sabine Valley & Northwestern.—This road is in operation between Longview and Beckville, Tex., about 28 miles, and it is expected that the tracklaying will be completed from the latter place to Carthage, 10 miles distant, in March. A line will then have to be surveyed to connection with the Houston, East & West Texas, about 17 miles south of Carthage, and also to a connection with the Marshall, Paris & Northwestern, about 12 miles north of Longview. Richard J. Evans, Longview, Tex., is General Manager.

Toledo, Columbus & Southern.—It is stated that this road will be extended from Findlay, O., its present terminus, 45 miles from Toledo, to Kenton, during this year, and possibly to Columbus. T. B. Brown, Toledo, O., is General Manager.

Tuscaloosa Northern.—It is rumored that this road has been sold to the Kansas City, Memphis & Birmingham. The road has been located and is being constructed from Tuscaloosa, Ala., to coal fields in Walker County, a distance of about 80 miles. It is said that it will be completed and extended to a connection with the Kansas City, Memphis & Birmingham at Jasper by the latter company.

Union Pacific.—The modifications in the Outhwaite funding bill proposed by President C. F. Adams were submitted to the Pacific Railroad Committee of the House of Representatives last week. The only change of any consequence is the proposition to fix the payments to be made by the company upon its debt at $\frac{1}{2}$ of 1 per cent. for the first five years, and $\frac{1}{2}$ of 1 per cent. for the second five. This would reduce the payments about \$200,000 for the first half, and increase them a similar sum during the last half of the ten year period. This plan is proposed because specially heavy payments will have to be made during the next five years.

Vancouver, Klickitat & Yakima.—Work has commenced on the first 10 miles of this road, which, it is expected, will be completed by June. The road is projected to extend from Vancouver, Washington Territory, across the Cascades Mountains. R. A. Habershaw, Vancouver, is Chief Engineer.

Waco & Brazos Valley.—It is said that the surveys for this road will be made at once and part of the line put under contract. The company was recently incorporated in Texas to build a road from Waco to Cameron, a distance of 100 miles. The general offices are at Waco.

Western New York & Southern.—This is the name under which the Lackawanna & Pittsburgh has been reorganized. The plan of reorganization provides for the issue of \$2,000,000 six per cent. first mortgage 40-year bonds, at \$12,500 per mile, \$1,200,000 6 per cent. income bonds and stock not to exceed \$30,000 per mile. It is expected that the extension from Perkinsville, on the main line of the road, to Geneva, a distance of 46 miles, will be completed during July.

Winston & Fayetteville.—It is expected that the work of extending this road to Asheboro will be commenced during the early part of March. A. B. Andrews, Raleigh, N.C., vice president of the Richmond & Danville, recently purchased the road.

Wisconsin Central Company.—A circular has been issued to the stockholders offering them the right to subscribe until March 10 to the securities of the Merrill, Wausau & Abbottford, the interest on which is guaranteed by the Wisconsin Central. The road will be leased to the Wisconsin Central Co., when completed, at an annual rental of 30 per cent. of gross earnings.

Yankton & Southwestern.—Incorporated in Nebraska to build a road from Yankton, Dak., south to Norfolk, Neb., and then southwest to Kearney Junction. The capital stock is placed at \$7,000,000, and work will commence when one-fourth of it has been subscribed.

Zazoo City & Greenville.—This road has been incorporated in Mississippi.

TRAFFIC AND EARNINGS.

Anthracite Coal Tonnage.

The shipments of anthracite coal for January are reported by John H. Jones, Official Accountant, as follows:

	1888.	1887.	Ind. or Dec.
Wyoming region	1,908,297	1,200,115	I. 708,182
Lehigh region	48,022	347,023	D. 299,001
Schuylkill region	299,373	696,175	D. 396,802
Total	2,255,602	2,243,313	I. 12,379

Cotton.

The cotton movement for the week ending Feb. 17 is reported as follows, in bales:

Interior markets :	1888.	1887.	Inc. or Dec.	P. c.
Receipts	40,446	59,963	D. 19,517	32.5
Shipments	48,648	71,395	D. 22,727	32.0
Stock	360,441	321,366	I. 39,075	12.2
Exports :				
Receipts	84,137	86,582	D. 2,445	2.5
Exports	105,890	101,878	D. 35,988	35.8
Stock	901,681	872,805	I. 28,876	3.3

Circus Rates.

The three traffic associations west of Chicago have joined in establishing reduced rates for circuses and traveling shows as follows: for distances of 50 miles and less, \$10 per car; the rates are graduated from this up to 8 cents per car per mile for trips of over 300 miles. Fifteen cars is the minimum, and discounts are to be made for long trains. Advertising cars 25 cents per mile, minimum, \$10 per trip or stop. Passenger or sleeping cars in the circus train to be charged 40 cents each per mile extra. The rules and conditions are the same as heretofore in force.

"816-Mileage Books."

It is said that the Ohio & Mississippi is selling a special mileage ticket with 816 coupons. This enables the passenger to make three trips between Cincinnati and St. Louis, 272 miles only being taken out for each trip. The distance is 340 miles, but the reduction is made to meet the competition of other lines, which sell 1,000 miles for \$20.

Railroad Earnings.

The following statement of the earnings of the Lake Shore & Michigan Southern for the year ending Dec. 31 has been made to the New York Railroad Commission:

	1887.	1886.	Inc. or Dec.
From freight	\$12,547,923	\$10,329,625	\$2,218,298
From passengers	4,650,653	4,020,550	I. 630,104
From express	413,265	400,718	I. 12,547
From mails	775,549	767,925	I. 7,624
From miscellaneous	324,572	340,638	D. 17,063
Total earnings	\$18,710,963	\$15,859,455	I. \$2,851,508
Expenses and taxes	11,029,598	9,741,622	I. 1,288,176
Per cent	58.95	61.36	
Net earnings	\$7,681,165	\$6,127,833	I. \$1,553,331
Fixed charges	3,649,645	3,712,978	D. 63,333
Balance	\$4,031,520	\$2,414,855	I. \$1,616,664

Earnings of railroad lines for various periods are reported as follows:

	1887.	1886.	Inc. or Dec.	P. c.
Bur., C. R. & Nor.	\$305,375	\$306,779	D. \$1,404	0.4
Net	114,410	96,681	I. 17,729	18.3
Cairo, V. & Chic.	64,632	63,691	I. 1,363	2.2
Net	13,074	12,815	I. 259	2.0
Chic., Burl. & N.	141,908	149,296	D. 7,298	4.9
Net	15,112	40,370	D. 25,258	6.1
Chi., Mu. & St. P.	2,517,769	2,250,241	I. 267,528	11.6
Net	1,651,023	1,118,669	I. 146,354	13.8
E. Ten., Va. & G.	503,188	470,619	I. 82,669	19.7
Net	205,630	190,733	I. 14,877	7.8
Mexican Nat.	174,049	154,470	I. 19,579	13.0
Net	1,227	9,006	D. 7,779	86.5
Ore. Imp. Co.	371,205	264,470	I. 106,735	40.3
Net	73,773	44,494	I. 31,279	72.1
Oreg. B. & N. Co.	539,849	403,152	I. 136,697	34.2
Net	257,802	142,824	I. 114,978	82.1
Scioto Valley	62,901	61,037	I. 1,864	3.0
Net	7,484	13,927	D. 6,443	46.0
Wabash	546,796	589,516	D. 42,750	7.3
Net	128,345	148,202	D. 19,857	13.2
Total (gross)	\$5,227,862	\$4,662,879	I. \$564,983	12.0
Total (net)	2,083,880	1,817,781	I. 325,436	18.1
Net			I. 59,337	
Year to December 31			I. 266,099	13.7

	1887.	1886.	Inc. or Dec.	P. c.
Bur., C. R. & No.	3,005,963	2,633,309	I. 72,654	2.5
Net	780,057	800,905	D. 20,848	-2.6
Cairo, Vin. & Chi.	764,550	658,815	I. 105,735	16.0
Net	241,390	130,227	I. 10,163	75.1
Cape F. & Y. Vy.	276,485	227,222	I. 49,363	21.4
Net	133,473	111,540	I. 21,933	18.7
Chic., B. & Q.	2,576,675	26,728,408	I. 87,673	3.2
Net	12,363,292	13,081,468	D. 718,366	5.5
Chi., Mil. & St. P.	25,366,124	24,713,403	I. 647,721	2.6
Net	10,039,433	10,158,139	I. 118,790	1.2
Chi., & W. M.	1,411,023	1,365,977	I. 18,045	1.3
Net	349,393	370,480	D. 21,087	5.7
Cleve. & Canton.	373,935	356,916	I. 17,049	4.7
Net	108,142	77,929	I. 30,213	38.7
Den. & R. G.	7,983,420	6,738,079	I. 1,245,341	18.6
Net	2,341,370	2,510,662	I. 730,704	29.2
Det., B. C. & AL.	469,296	241,696	I. 227,600	94.8
Net	203,459	117,855	I. 87,504	73.0
E. Tenn., V. & G.	5,39,469	4,283,211	I. 1,046,258	24.3
Net	1,675,075	1,575,404	I. 99,671	6.2
Gd. R. & Ind.	2,948,075	2,535,485	I. 41,250	16.5
Net	965,850	870,046	I. 95,804	11.0
K. C. Ft. S. & G.	2,732,204	2,533,338	I. 192,866	7.7
Net	1,071,633	1,063,811	I. 7,222	0.7
K. C. Sp. & Mem.	2,038,965	1,569,708	I. 469,257	29.3
Net	691,239	489,709	I. 210,520	43.9
Kentucky Cent.	1,067,468	920,697	I. 146,771	16.0
Net	455,352	332,324	I. 12,028	37.3
L. N. O. & Tex.	2,243,133	1,803,782	I. 439,431	24.4
Net	690,848	551,219	I. 48,620	27.0
Mexican Central.	4,886,580	3,857,703	I. 1,028,874	27.4
Net	2,169,427	1,404,618	I. 764,500	50.6
Mexican Nat.	1,798,915	1,743,521	I. 55,394	3.3
Net	194,727	297,949	D. 102,322	35.8
Minn. & St. L.	1,491,388	1,549,619	I. 58,231	34.1
Net	428,147	498,688	D. 70,541	14.1
New Brunswick.	816,443	805,067	I. 11,376	1.4
Net	244,972	254,135	D. 9,153	3.7
N. Y., P. & Nor.	50,1156	42,906	I. 77,250	17.8
Net	93,007	61,117	I. 31,890	53.2
N. Y., S. & West.	1,395,186	1,129,441	I. 265,745	24.1
Net	633,047	491,779	I. 141,368	28.8
Nofolk & West.	4,254,704	3,525,056	I. 1,023,38	30.4
Net	1,771,013	1,394,146	I. 470,867	36.0
North. Cent.	6,212,936	5,474,617	I. 738,309	13.4
Net	2,073,484	1,913,049	I. 14,535	7.4
Oreg. Imp. Co.	4,167,707	2,999,483	I. 1,168,324	38.9
Net	1,166,248	740,226	I. 424,022	57.0
Oreg. R. & N. Co.	5,376,258	5,314,662	I. 31,296	0.7
Net	2,478,533	2,649,070	I. 161,633	7.1
Rome, W. & Oz.	3,216,600	2,878,675	I. 336,925	11.0
Net	1,431,469	1,274,622	I. 156,844	12.1
Southern Pacific:				
Gal. H. & S. A.	3,347,184	2,599,463	I. 747,721	28.6
Net	682,047	277,041	I. 403,006	14.9
Louisiana West	843,704	644,688	I. 199,106	32.2
Net	414,836	329,216	I. 85,020	55.9
Mor. L. & Texas.	4,084,359	4,185,457	I. 498,822	11.8
Net	1,346,279	1,043,127	I. 303,52	30.3
N. Y. Tex. & M.	179,529	158,858	I. 11,698	7.3
Net	22,107	9,006	I. 13,101	145.6
Texas & N. O.	1,267,563	906,169	I. 269,394	30.4
Net	563,353	434,419	I. 128,914	31.2
A'lantic System	10,313,403	8,586,617	I. 1,726,791	26.1
Net	3,029,529	2,092,809	I. 936,713	44.0
Pacific System.	27,055,769	23,523,541	I. 3,532,238	14.7
Net	11,990,236	11,324,136	I. 675,100	0.1
Tot. So. Pac.	37,369,205	32,115,158	I. 5,259,047	16.0
Net	15,028,558	13,416,945	I. 1,611,813	12.3
Union Pacific.	28,557,766	26,280,189	I. 2,277,580	8.8
Net	11,941,005	9,930,609	I. 2,020,380	20.3
Wabash	6,901,587	6,791,215	I. 110,372	1.6
Net	2,117,228	1,810,440	I. 306,788	17.0
Total (gross)	\$190,536,728	\$172,273,650	I. \$18,263,072	10.6
Total (net)	74,741,058	67,886,928	I. 7,805,926	11.5
Net			I. 1,060,926	...

Early reports of monthly earnings are usually estimated in part, and are subject to correction by later statements.

Coal.

The coal tonnages for the week ending Feb. 18 are reported as follows:

	1888.	1887.	Inc. or Dec.	P. c.
Anthracite	628,575	692,583	D. 64,08	0.8
Bituminous	314,866	290,595	I. 24,271	8.4

The Cumberland coal trade for the week ending Feb. 18 amounted to 46,288 tons; and for the year to date 398,280 tons.

The Interstate Commerce Commission.

In the case of Heck & Petree vs. the East Tennessee, Virginia & Georgia the Richmond & Danville, the Coal Creek & New River Railroad and others, the Commission decided that a short road (owning no rolling stock) chartered by and owned wholly within the state of Tennessee is, when used by connecting companies for inter-state traffic "one of the instrumentalities of shipment or carriage" of inter-state traffic and subject to the law. This short line must be accessible to all inter-state shippers on equal and reasonable terms. The claim for pecuniary damages alleged to have been sustained by discrimination between different mine owners

presents a case at common law in which defendants are entitled to a jury trial.

The case of Wm. H. Heard (colored) vs. the Georgia Railroad was decided in favor of the plaintiff, Mr. Heard having been subjected to undue and unreasonable prejudice and disadvantage in being compelled to ride in a car of inferior accommodations. Separation of white and colored passengers is not unlawful if accommodations and comforts are not unequal.

The motion for a rehearing of Riddle, Dean & Co. vs. the Pittsburgh & Lake Erie was denied. In James Pyle & Son vs. the East Tennessee, Virginia & Georgia it was held that paint and soap powders should be in fifth instead of fourth class.

On Feb. 16 the case of the Boston Chamber of Commerce against the Lake Shore & Michigan Southern, the New York Central & Hudson River and the Boston & Albany roads was decided for the defendants. The complaint was that freight rates from the west to Boston, being higher than those to New York, unjustly discriminate against the former city. The opinion says:

"The east-bound rates are 10 cents per 100 lbs. higher on the first two classes to Boston for local consumption than to New York, and 5 cents per 100 lbs. higher in the four other classes. The export rates to Boston are equal with New York, but are not made so because the conditions of transportation are alike, but in deference to the laws of trade and the interests of commerce and to make them equal with the various seaboard cities, New York, Philadelphia, Baltimore, Portland and Montreal, in respect to the foreign trade upon which the railroad rate from the interior is regarded as part of the general through rate to foreign markets. The differences between the Boston local rates and New York have existed for many years, and have been maintained on the ground that the differences in the conditions of transportation service the cost of service to Boston proportional to the value of the breaking up and rearranging of trains at Albany; the heavier grades of the Boston & Albany requiring smaller trains, more engines, train hands and fuel; the somewhat longer detention of cars in New England for unloading and reloading to go West, the very much greater volume of business from the West to New York warranting lower rates on account of the larger aggregate earnings of the roads; the competition of various other lines of railroad at New York, all carrying at the same rates; the great volume of traffic over the lakes, the Erie Canal and Hudson River to New York carried at materially lower rates than by the rail lines, and the extraordinary geographical and commercial advantages of New York, arising from its unrivaled harbor, its superior ocean service, and the competition of rival carriers to that port are elements that enter into and determine the rates to that city, and therefore it is both natural and reasonable that upon just principles of transportation Boston is not of right entitled to equal rates with New York. The Commission holds, therefore, that the difference between the Boston local rates and the New York rates has not been shown, in the opinion of